CRAMP'S SHIPYARD

1830 1910

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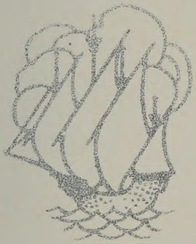
The Wm. Cramp & Sons Ship & Engine Building Co.

Compliments of Henry S Grove

75

CRAMP'S SHIPYARD

The WILLIAM CRAMP & SONS SHIP
& ENGINE BUILDING COMPANY
1830
The I·P·MORRIS COMPANY
1828
The KENSINGTON SHIPYARD CO·
1900



PHILADELPHIA,
PENNSYLVANIA
U·S·A·

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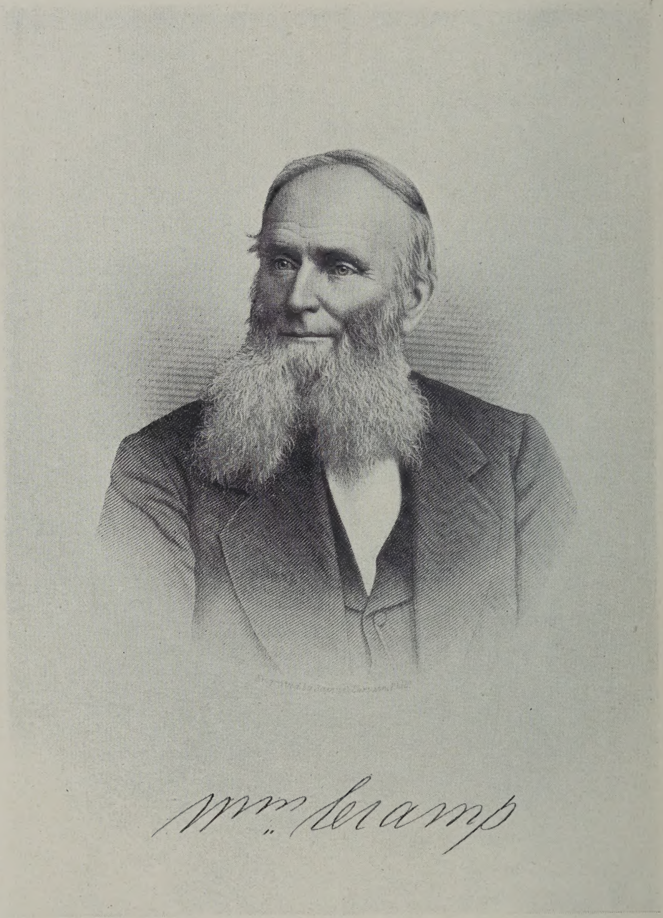

Wm Cramp

WILLIAM CRAMP
FOUNDER, 1830

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HENRY S. GROVE
President

HARRY W. HAND
Vice-President and General Manager

CHARLES T. TAYLOR
Secretary and Treasurer

DIRECTORS

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Chairman of the Board of Directors

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H. A. BERWIND
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CARROLL S. SMITH
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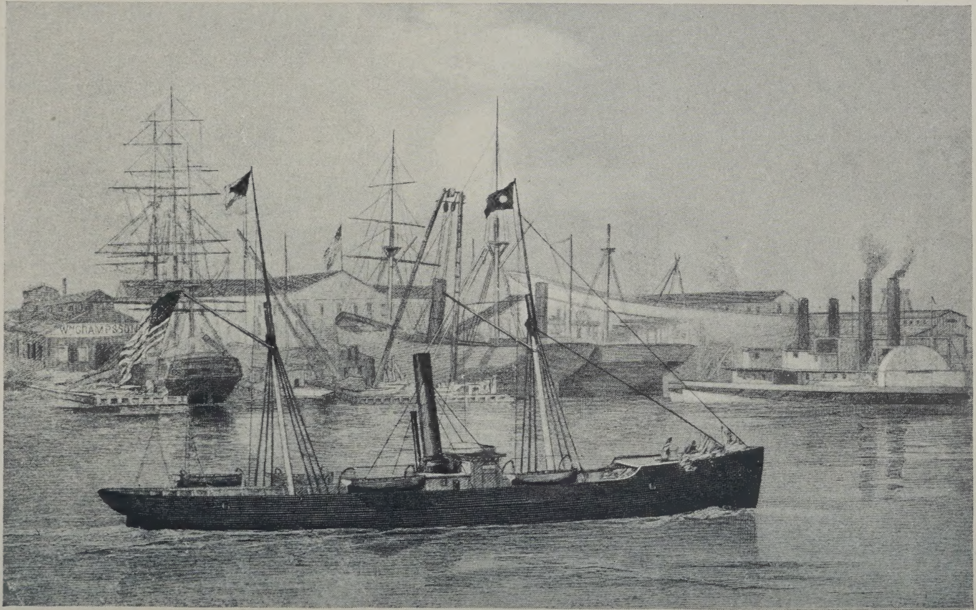

CRAMP'S SHIPYARD, 1872

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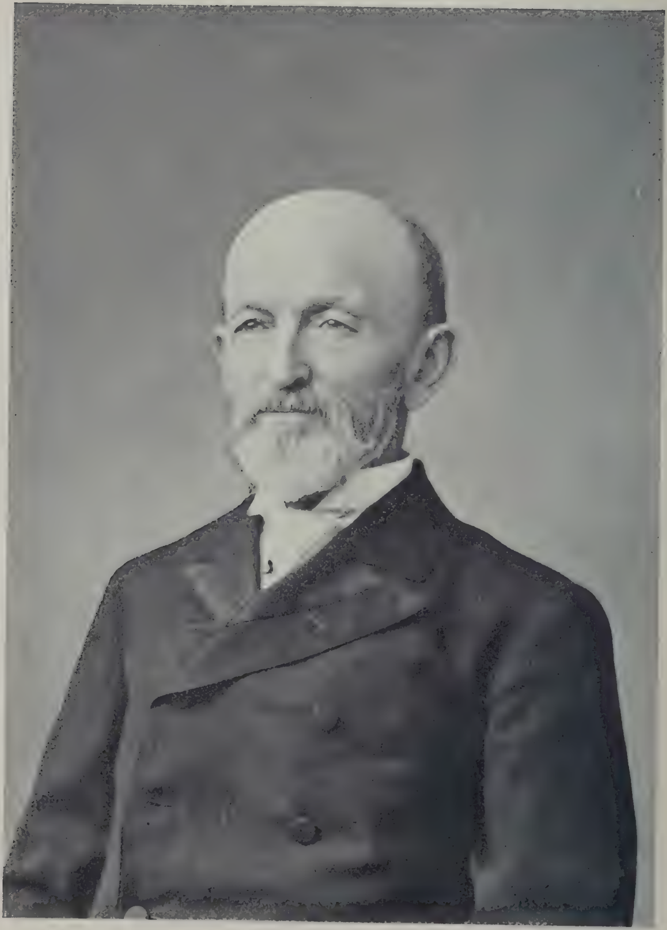
CRAMP'S SHIPYARD, 1906

Introduction

IN 1830, when Mr. William Cramp started a small shipyard in Kensington, it would have required a farsighted man to have foretold the coming age of steel, and that the timber obtained from nearby forests would cease to be the shipbuilder's material.

Mr. Cramp did not dream that his neighbor, Mr. Isaac P. Morris, who had started a plant for building special machinery about two years before the shipyard was founded, would, years later on, contribute the propelling machinery for his vessels; nor is it probable that he appreciated the important part that machinery would hold in the construction of modern ships. But these two men, then the masters of their arts, were founding two industries destined to grow up, step by step; and, finally, with the advances of science and the improvements and inventions of the manufacturing arts, combine to form the homogeneous whole required to carry on one of the great developments of modern times.

In the following pages, the growth and work of the shipyard will first be treated, and some of its achievements past and present will be pointed out. Then will follow a description of the principal works of the I. P. Morris Company, in its various special fields of mechanical engineering, with shorter reference to the special work of the Cramp Company's repair yard, and its highly specialized brass foundry.



CHARLES H. CRAMP
PRESIDENT 1879 TO 1903

The William Cramp & Sons Ship & Engine Building Company

CRAMP'S Shipyard of to-day is the result of the growth and development of a shipyard established by William Cramp in 1830. Originally located at the foot of Otis Street (now East Susquehanna Avenue), and later at the foot of Palmer Street (the present site of the Company's dry dock, marine railways and repair shops), the plant of the early days bore little resemblance to that of to-day. But even then, as now, its ships represented the latest and most perfect examples of shipbuilding. In 1872 the business had outgrown the Palmer Street yard and about one-third of the water front of the present establishment was purchased. In March of that year the Company as it now exists was incorporated under its present name "The William Cramp & Sons Ship & Engine Building Company."

William Cramp died in 1879 and Charles H. Cramp, his eldest son, succeeded to the presidency. For twenty-four years he was the active head of the business. Under his management, in 1891, the Cramp Company obtained control of the I. P. Morris Company, and in 1899–1900 large additions were made to the plant, comprising additional building slips and water front, a large new machine shop and a new power plant. In 1903 Henry S. Grove succeeded to the presidency, and under his management the Company's progress and development has gone uninterruptedly forward.

The record of the thirty-seven years since the Company's incorporation shows an increase in actual value of ground and equipment from about $500,000 to about $12,800,000, representing a normal and healthy progress and development in the effort to keep fully up with the best requirements of the shipbuilding business.

The total number of vessels of all descriptions built or building since 1830 is 366; and the total number of marine engines is 290. Thirty-six of the vessels have been for the United States Navy; one first-class battleship, one protected cruiser, three corvettes, and one unprotected cruiser for the Imperial Russian Navy; one protected cruiser for the Imperial Japanese Navy; one for the Imperial Ottoman Navy; and a gunboat for the Venezuelan Navy. Over one hundred of the steamers included in the above number range between 1000 and 12,500 tons register, while the balance of the list is made up of steam boats, tugs and yachts, with twenty-eight first-class sailing vessels and one hundred craft for various special uses. This Yard has constructed eight trans-atlantic liners, the only ones ever built in the United States.

Not long after the Civil War it was found necessary to add to the shipyard a plant for the building of propelling machinery. At the present time the Company is equipped with one of the best machine shops and boiler shops for turning out marine work, and has built engines to propel every type of craft from small tug boats and yachts of 500 horse power to the monster battleships and armored cruisers of 30,000 horse power. In the last three years a number of Parsons' turbine propelling engines have been built at this yard. Cramp-Zoelly marine turbines for two torpedo boat destroyers for the United States Navy are now in course of construction.

It is the earnest endeavor of the present management to keep the plant in all respects abreast of the times and to maintain a staff well equipped to handle every problem that may arise in modern shipbuilding. How well this is being accomplished, the results illustrated in the following pages may be permitted to speak for themselves.

HENRY S. GROVE
PRESIDENT SINCE 1903

MEN-OF-WAR BUILT AT CRAMP'S SHIPYARD

UNITED STATES NAVY

Shipyard Number	Name	Type	Year	Length	Breadth	Draft	Displacement	Indicated Horse Power	Type of Engine	Speed	Main Battery
108	New Ironsides . .	Iron Clad	1862	230	56		5080	1800	Simple, back acting	11	16—11-in. S. B. 2—200 pdr. Parrotts
113	Wyalusing	Double end Gun Boat	1863				970	400	Simple, back acting	9	6—9-in. S. B. 1—60 pdr. Parrott
119	Yazoo	Monitor	1863				2150	750	Simple Grasshopper		2—15-in. S. B.
126	Chattanooga . . .	Cruiser	1865				3300				

MEN-OF-WAR BUILT AT CRAMP'S SHIPYARD—CONTINUED

SHIPYARD NUMBER	NAME	TYPE	YEAR	LENGTH	BREADTH	DRAFT	DISPLACEMENT	INDICATED HORSE POWER	TYPE OF ENGINE	SPEED ON TRIAL	MAIN BATTERY
195	Terror	Monitor	1874	250	55½	14½	4000	1800	Twin screw Compound	10.5	4—10-in. B. L. R. 8—R. F. Guns
254	Baltimore	Protected Cruiser	1890	335	48½	18½	4413	10064	Twin screw Horizontal Triple	20.1	6— 6-in. B. L. R. 4— 8-in. B. L. R.
255	Yorktown	Gun Boat	1889	230	36	14	1700	3398	Twin screw Horizontal Triple	16.14	6— 6-in. B. L. R.
256	Vesuvius	Dynamite Cruiser	1890	246¼	26½	9	725	4366	Twin screw Vertical Triple	21.6	3—15-in. Pneumatic Dynamite Guns
257	Philadelphia	Protected Cruiser	1890	335	48½	19¼	4324	10500	Twin screw Horizontal Triple	19.7	12— 6-in. B. L. R.

MEN-OF-WAR BUILT AT CRAMP'S SHIPYARD—CONTINUED

Shipyard Number	Name	Type	Year	Length	Breadth	Draft	Displacement	Indicated Horse Power	Type of Engine	Speed on Trial	Main Battery
258	Newark	Protected Cruiser	1890	320	49	18	4083	8869	Twin screw Horizontal Triple	19.0	12—6-in. B. L. R.
268	New York	Armored Cruiser	1893	380½	64	23¼	8150	17400	Twin screw Vertical Triple 2 eng. on each shaft	21	6—8-in. B. L. R. 12—4-in. B. L. R.
269	Columbia	Protected Cruiser	1894	412	58	24	7475	18509	Triple screw Vertical Triple	22.81	1— 8-in. B. L. R. 2— 6-in. B. L. R. 8— 4-in. B. L. R.
270	Indiana	Coast Defence Battleship	1895	348	69¼	24	10298	9738	Twin screw Vertical Triple	15.55	4—13-in. B. L. R. 8— 8-in. B. L. R. 4— 6-in. B. L. R.
271	Massachusetts	Coast Defence Battleship	1896	348	69¼	24	10298	10402	Twin screw Vertical Triple	16.21	4—13-in. B. L. R. 8— 8-in. B. L. R. 4— 6-in. B. L. R.

MEN-OF-WAR BUILT AT CRAMP'S SHIPYARD—CONTINUED

SHIPYARD NUMBER	NAME	TYPE	YEAR	LENGTH	BREADTH	DRAFT	DISPLACEMENT	INDICATED HORSE POWER	TYPE OF ENGINE	SPEED ON TRIAL	MAIN BATTERY
273	Minneapolis	Protected Cruiser	1894	412	58	24	7475	21800	Triple screw Vertical Triple	23.05	1— 8-in. B. L. R. 2— 6-in. B. L. R. 8— 4-in. B. L. R.
275	Brooklyn	Armored Cruiser	1896	400	64⅔	24	9145	18769	Twin screw Vertical Triple, 2 eng. On each shaft	21.91	8— 8-in. B. L. R. 12— 5-in. B. L. R.
276	Iowa	Sea Going Battleship	1897	360	72	24	11346	11834	Twin screw Vertical Triple	17.09	4—12-in. B. L. R. 8— 8-in. B. L. R. 6— 4-in. B. L. R.
290	Alabama	First Class Battleship	1900	368	72½	23½	11570	11365	Twin screw Vertical Triple	17.01	4—13-in. B. L. R. 14— 6-in. B. L. R.
302	Maine..........	First Class Battleship	1902	388	72	23½	12500	15840	Twin screw Vertical Triple	18	4—12-in. B. L. R. 16— 6-in. B. L. R.

MEN-OF-WAR BUILT AT CRAMP'S SHIPYARD—CONTINUED

Shipyard Number	Name	Type	Year	Length	Breadth	Draft	Displacement	Indicated Horse Power	Type of Engine	Speed on Trial	Main Battery
316	Colorado	Armored Cruiser	1905	502	69½	24 1/12	13780	27373	Twin screw Vertical Triple	22.24	4— 8-in. B. L.R. 14— 6-in. B. L.R.
317	Pennsylvania ...	Armored Cruiser	1905	502	69½	24 1/12	13780	28006	Twin screw Vertical Triple	22.44	4— 8-in. B. L. R. 14— 6-in. B. L. R.
322	Tennessee	Armored Cruiser	1906	502	72½	25	14500	28300	Twin screw Vertical Triple	22.16	4—10-in. B. L. R. 16— 6-in. B. L. R.
327	Mississippi.......	First Class Battleship	1908	375	77	24⅔	13000	13631	Twin screw Vertical Triple	17.11	4—12-in. B. L. R. 8— 8-in. B. L. R. 8— 7-in. B. L. R.
328	Idaho...........	First Class Battleship	1908	375	77	24⅔	13000	13765	Twin screw Vertical Triple	17.14	4—12-in. B. L. R. 8— 8-in. B. L. R 8— 7-in. B. L. R.
346	South Carolina...	First Class Battleship	1909	450	80	24½	16000	18375	Twin Screw Vertical Triple	19.25	8—12-in. B. L. R.

MEN-OF-WAR BUILDING AT CRAMP'S SHIPYARD

Shipyard Number	Name	Type	Year	Length	Breadth	Draft	Displacement	Indicated Horse Power	Type of Engine	Contract Speed	Main Battery
350	Joseph B. Smith..	Torpedo Boat Destroyer	1909	289	26	8	700	10000	Parsons' Turbines	28	3 Torpedo Tubes 7 Small Guns
351	Roswell H. Lamson	Torpedo Boat Destroyer	1909	289	26	8	700	10000	Parsons' Turbines	28	3 Torpedo Tubes 7 Small Guns
352	Lewis Warrington	Torpedo Boat Destroyer	1909	289	26	8⅓	742	12000	Cramp-Zoelly Turbines	30	3 Torpedo Tubes 7 Small Guns
353	John Mayrant ...	Torpedo Boat Destroyer	1909	289	26	8⅓	742	12000	Cramp-Zoelly Turbines	30	3 Torpedo Tubes 7 Small Guns
354	Thrasher........	Submarine Torpedo Boat	1909								
355	Cyclops.........	Collier	1909	520	65	27½	19200	7200	Twin Screw Vertical Triple	14	
361	No. 36..........	Torpedo Boat Destroyer	1909	289	26½	8⅓	742	12000	Parsons' Turbines	29½	3 Torpedo Tubes 7 Small Guns
365	Wyoming.......	First Class Battleship	1909	554	93	28½	26000	30000	Parsons' Turbines	20½	12—12-in. B.L.R. 27 Small Guns

FOREIGN MEN-OF-WAR BUILT AT CRAMP'S SHIPYARD

IMPERIAL RUSSIAN NAVY

Shipyard Number	Name	Type	Year	Length	Breadth	Draft	Displacement	Indicated Horse Power	Type of Engine	Speed on Trial	Main Battery
200	Europe	Corvette	1879	305	37		3170		Single screw Vertical Compound		
203	Zabiaka..........	Cruiser	1880	225	30		1230	1393	Single screw Vertical Compound	15	
204	Asia.............	Corvette	1879	267½	35		2490		Single screw Vertical Compound		
205	Africa	Corvette	1879	278	38		2852		Single screw Vertical Compound		
300	Retvizan.........	First Class Battleship	1902	384	72⅕	24½	12750	18255	Twin screw Vertical Triple	18	4—12-in. B. L. R. 12— 6-in. R. F.
301	Variag..........	Protected Cruiser	1901	420	52	19½	6500	17500	Twin screw Vertical Triple	23¼	12—6-in. R. F.

FOREIGN MEN-OF-WAR BUILT AT CRAMP'S SHIPYARD—CONTINUED

Shipyard Number	Name	Type	Year	Length	Breadth	Draft	Displacement	Indicated Horse Power	Type of Engine	Speed on Trial	Main Battery
IMPERIAL JAPANESE NAVY											
291	Kasagi.........	Protected Cruiser	1898	374½	48¾	17¾	5415	17000	Twin screw Vertical Triple	22¾	2—8-in. B. L. R. 11—4.7-in. R. F.
OTTOMAN NAVY											
315	Medjidia	Protected Cruiser	1904	330	42	16	3300	12000	Twin screw Vertical Triple	22.4	2—6-in. R. F. 8—4.7-in. R. F.
VENEZUELAN NAVY											
62	Libertador......	Gun Boat	1859				355				

UNITED STATES REVENUE SERVICE

288	Hugh McCulloch	Cutter	1897	208½	32½	12⅔	1096	2240	Single screw Vertical Triple	17.23	

THE MOST IMPORTANT COMMERCIAL VESSELS BUILT AT CRAMP'S SHIPYARD

CLIPPER SHIPS

Shipyard Number	Name	Year	Gross Tonnage
66	Isaac Jeanes	1853	810
67	Morning Light		850
68	Chamberlin		910
71	Bridgewater		1557
72	Manitou		1400
75	Trucks		900

OCEAN STEAMSHIPS

International Mercantile Marine Co. & American Line

180	Pennsylvania	1872	3126
181	Ohio	1872	3392
182	Indiana	1873	3126
183	Illinois	1873	3126
277	St. Louis	1895	10700
278	St. Paul	1895	10700
311	Kroonland	1902	12500
312	Finland	1902	12500

New York & Cuba Mail S. S. Co.—Ward Line

294	Havana	1899	5667
295	Mexico	1899	5667
303	Morro Castle	1900	6004
309	Esperanza	1901	4702
310	Monterey	1901	4702
332	Merida	1906	6207
335	Mexico	1906	6207
340	Havana	1907	6391
341	Saratoga	1907	6391

THE MOST IMPORTANT COMMERCIAL VESSELS BUILT AT CRAMP'S SHIPYARD

Continued

Clyde Steamship Company

Shipyard Number	Name	Year	Gross Tonnage
250	Cherokee	1886	2557
251	Seminole	1886	2557
260	Iroquois	1888	2944
266	Algonquin	1890	2833
283	Comanche	1895	3202
313	Apache	1901	3378
314	Arapahoe	1901	3378
319	Huron	1902	3318
321	Kiowa	1903	2953
329	Mohican	1904	2255
330	Chippewa	1905	2696
331	Onondaga	1905	2696
345	Katahdin	1906	2696
349	Mohawk	1908	4500

Southern Pacific and Morgan Line

207	Chalmette	1879	2982
241	Eureka	1884	3531
242	El Paso	1884	3531
243	El Dorado	1884	3531
249	El Monte	1886	3531
261	El Mar	1889	3531
267	El Sol	1890	4523
338	Momus	1907	6878
339	Antilles	1907	6878

Oceanic Steamship Company

233	Mariposa	1883	3158
234	Alameda	1883	3158
304	Sierra	1900	5989
305	Sonoma	1900	6253
306	Ventura	1900	6253

THE MOST IMPORTANT COMMERCIAL VESSELS BUILT AT CRAMP'S SHIPYARD

CONTINUED

NEW ENGLAND NAVIGATION COMPANY

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
324	Transfer No. 16	1904	268
325	" " 17	1904	268
326	" " 18	1904	268
336	" " 19	1905	270
337	" " 20	1905	270
342	Massachusetts	1907	4029
343	Bunker Hill	1907	4029
344	Old Colony	1907	4029
348	Commonwealth	1908	6350

RED "D" LINE

228	Valencia	1882	1598
245	Philadelphia	1885	2099
262	Caracas	1889	2584
263	Venezuela	1889	2842
285	Curacoa	1895	1503

AMERICAN MAIL STEAMSHIP COMPANY

296	Admiral Dewey	1898	2104
297	Admiral Sampson	1899	2104
298	Admiral Schley	1899	2104
299	Admiral Farragut	1899	2104

OREGON RY. & NAVIGATION CO.

202	State of California	1879	2266
225	City of Pueblo	1881	2779
227	Queen of the Pacific	1882	2728

THE MOST IMPORTANT COMMERCIAL VESSELS BUILT AT CRAMP'S SHIPYARD

CONTINUED

CENTRAL PACIFIC RAILWAY CO.

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
230	Tacoma	1882	3119
231	San Pedro	1883	3119
239	San Pablo	1884	3119

METROPOLITAN LINE

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
240	H. F. Dimock	1884	2626
252	Herman Winter	1887	2626
264	H. M. Whitney	1890	2707

MERCHANTS' AND MINERS' LINE

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
223	Allegheny	1881	2014
224	Berkshire	1882	2014
265	Essex	1890	2531

PLANT LINE

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
247	Mascotte	1885	884
253	Olivette	1887	1611

STANDARD OIL COMPANY

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
318	Col. E. L. Drake	1903	4205

THE MOST IMPORTANT COMMERCIAL VESSELS BUILT AT CRAMP'S SHIPYARD

CONTINUED

CENTRAL RAILROAD OF NEW JERSEY

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
259	Monmouth	1888	1440
320	Asbury Park	1903	2128

NEW YORK & SAN DOMINGO LINE

SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
179	Geo. W. Clyde (First compound eng. in America)	1872	1805

CITY OF PHILADELPHIA

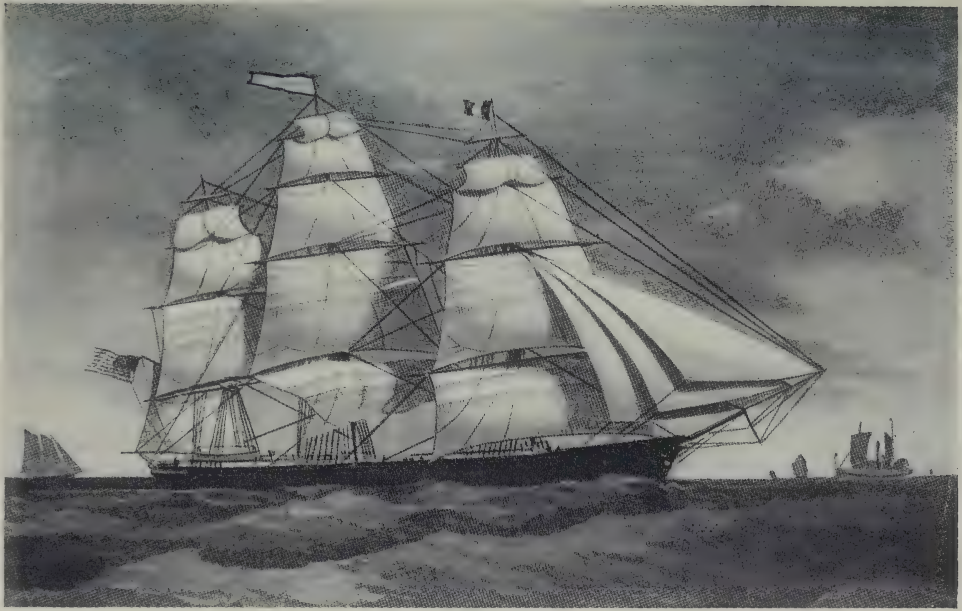
SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
333	John Weaver (Ice Breaker) . .	1906	1769

STATE OF PENNSYLVANIA

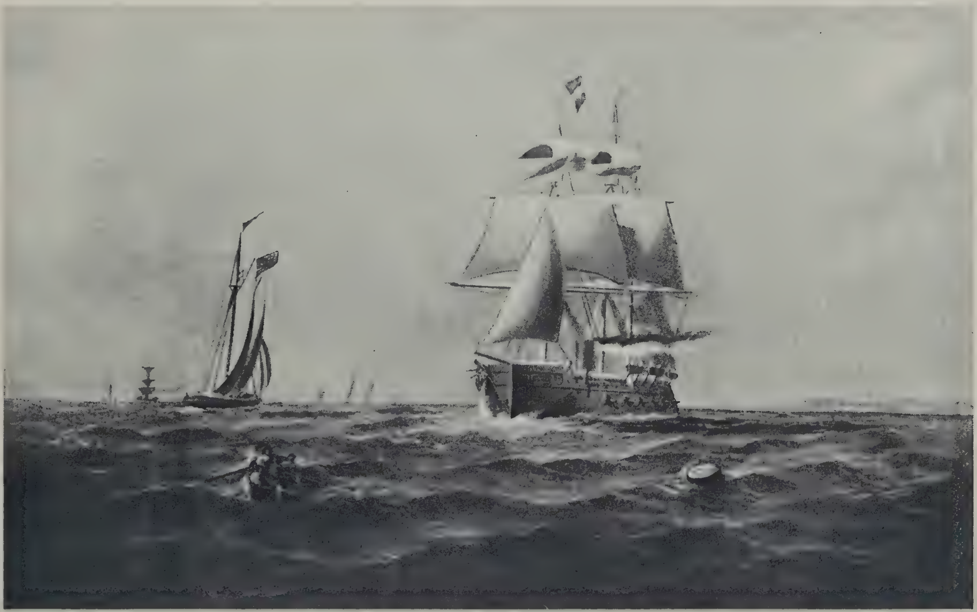
SHIPYARD NUMBER	NAME	YEAR	GROSS TONNAGE
323	M. S. Quay (Harbor-master's Tug)	1904	113

YACHTS

SHIPYARD NUMBER	NAME	YEAR	PURCHASER
211	Corsair (Kanapaha) . .	1880	Mr. C. J. Osborn
212	Stranger	1880	Mr. George Osgood
235	Atalanta.	1883	Mr. Jay Gould
246	Peerless (First triple exp. eng. in America)	1885	Mr. Chas. W. Harkness
274	Columbia	1894	Mr. J. H. Ladew
284	Thespia	1896	Mr. David Dows, Jr.
293	Dorothea	1898	Mr. Thos. McKean

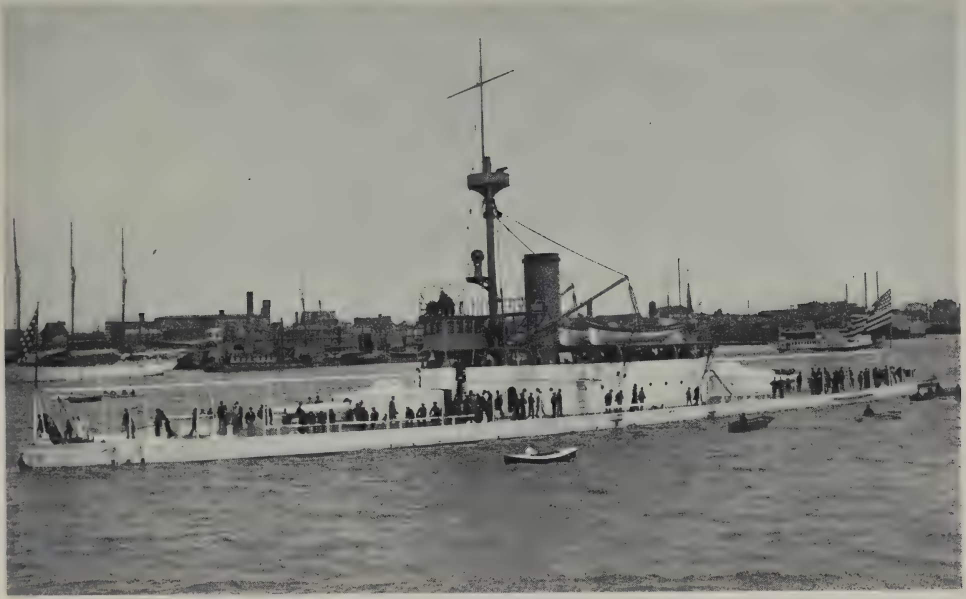


"MORNING LIGHT," CLIPPER SHIP
Gross Tonnage, 850 tons.



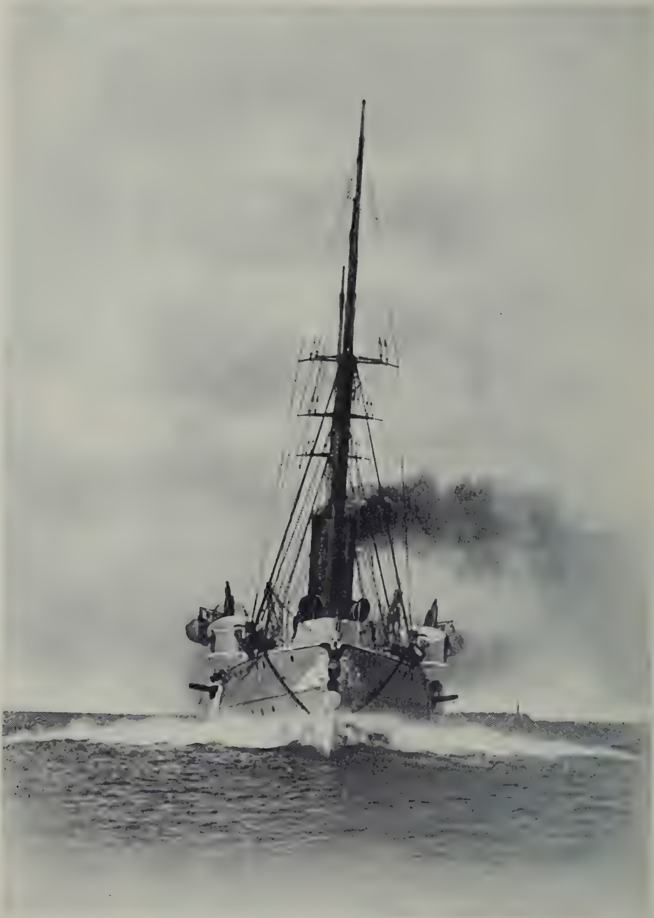
U. S. S. "NEW IRONSIDES," IRON CLAD

Length, 230 ft. Beam, 56 ft. Displacement, 5080 tons. Speed, 11 knots.



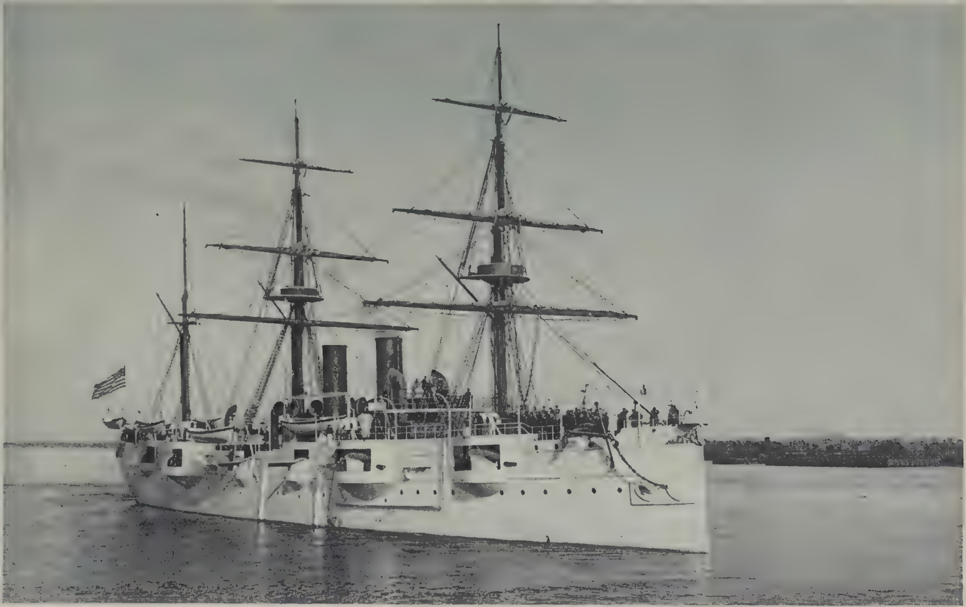
U. S. S. "TERROR," MONITOR

Length, 250 ft. Beam, 55 ft. 6 in. Displacement, 4000 tons. Speed on trial, 10.5 knots.



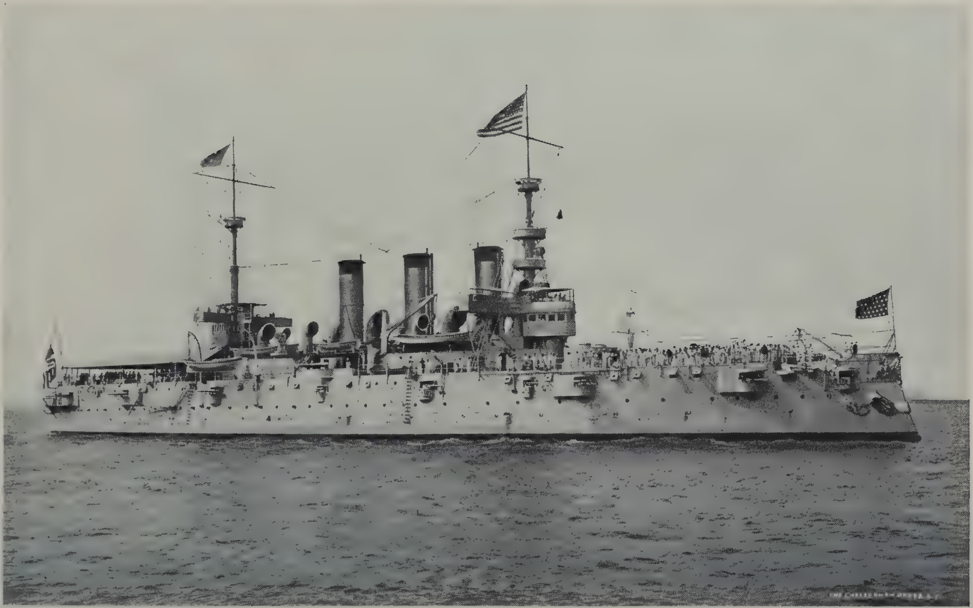
U. S. S. "YORKTOWN," GUNBOAT

Length, 230 ft. Beam, 36 ft. Draft, 14 ft. Displacement, 1720 tons.
Contract speed, 16.0 knots. Speed on trial, 16.14 knots.



U. S. S. "NEWARK," PROTECTED CRUISER

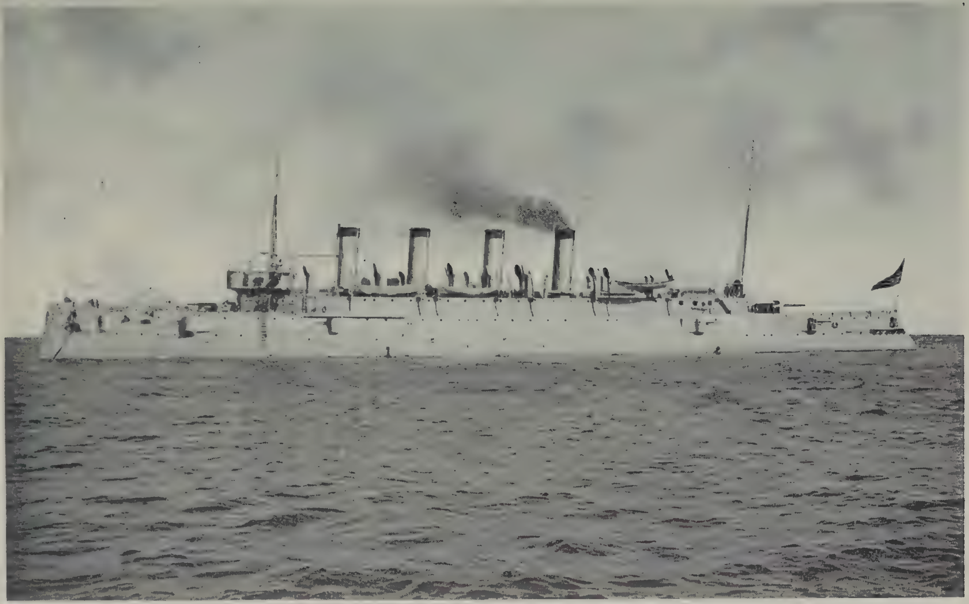
Length, 320 ft. Beam, 49 ft. Draft, 18 ft. 9 in. Displacement, 3970 tons.
Contract speed, 18.0 knots. Speed on trial, 19.0 knots.



U. S. S. "NEW YORK," ARMORED CRUISER

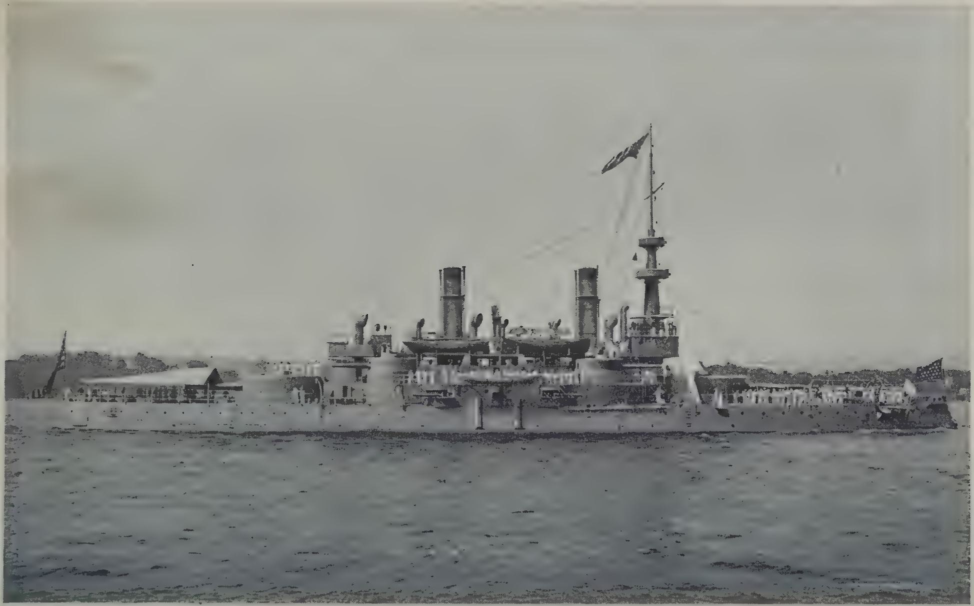
Length, 380 ft. Beam, 64 ft. Draft, 23 ft. 3 in. Displacement, 8480 tons

Contract speed, 20.0 knots. Speed on trial, 21.0 knots.



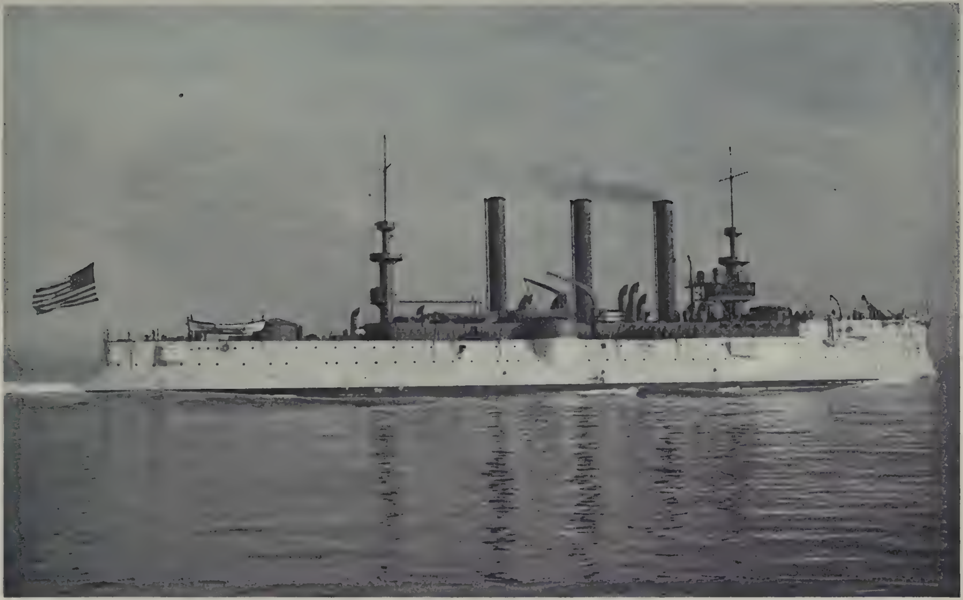
U. S. S. "COLUMBIA," PROTECTED CRUISER

Length, 412 ft. Beam, 58 ft. Draft, 24 ft. Displacement, 7387 tons.
Contract speed, 21.0 knots. Speed on trial, 22.81 knots.



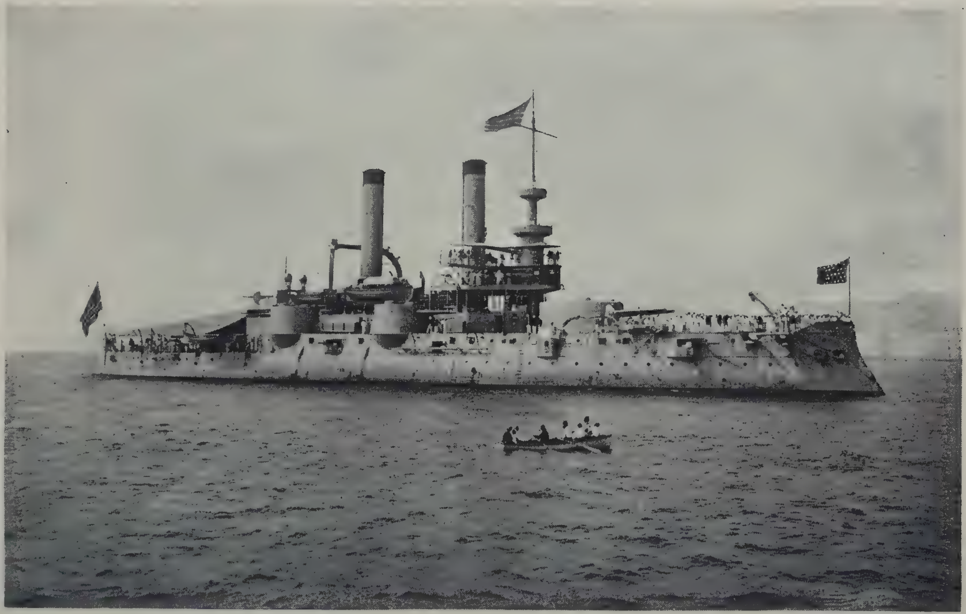
U. S. S. "INDIANA," BATTLESHIP

Length, 348 ft. Beam, 69 ft. 3 in. Draft, 24 ft. Displacement, 10,225 tons.
Contract speed, 15.0 knots. Speed on trial, 15.55 knots.



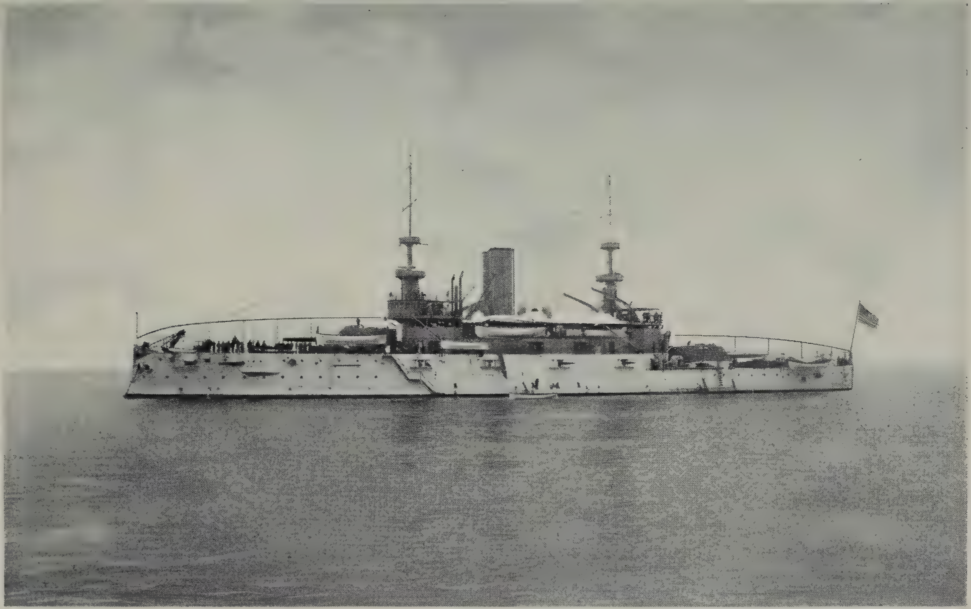
U. S. S. "BROOKLYN," ARMORED CRUISER

Length, 400 ft. Beam, 64 ft. 8 in. Draft, 24 ft. Displacement, 9145 tons.
Contract speed, 20.0 knots. Speed on trial, 21.91 knots



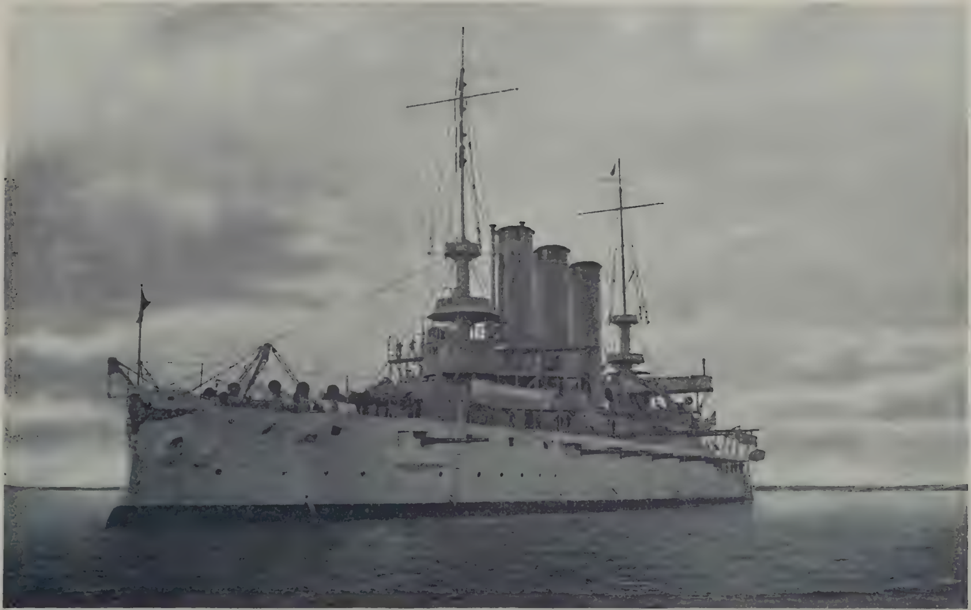
U. S. S. "IOWA," BATTLESHIP

Length, 360 ft. Beam, 72 ft. Draft, 24 ft. Displacement, 11,363 tons.
Contract speed, 16.0 knots. Speed on trial 17.09.



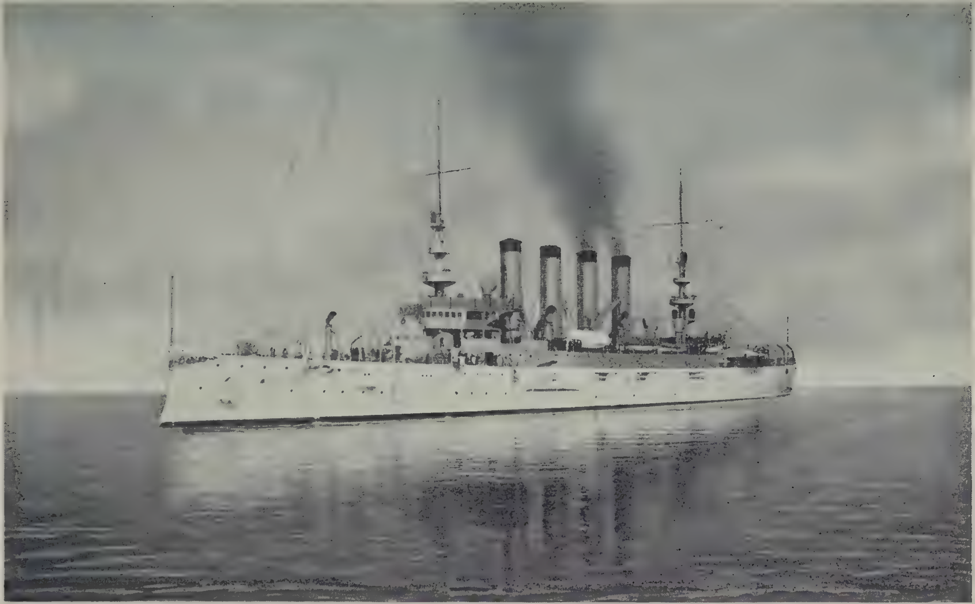
U. S. S. "ALABAMA," BATTLESHIP

Length, 368 ft. Beam, 72 ft. 6 in. Draft, 23 ft. 6 in. Displacement, 11,570 tons.
Contract speed, 16.0 knots. Speed on trial, 17.01 knots.



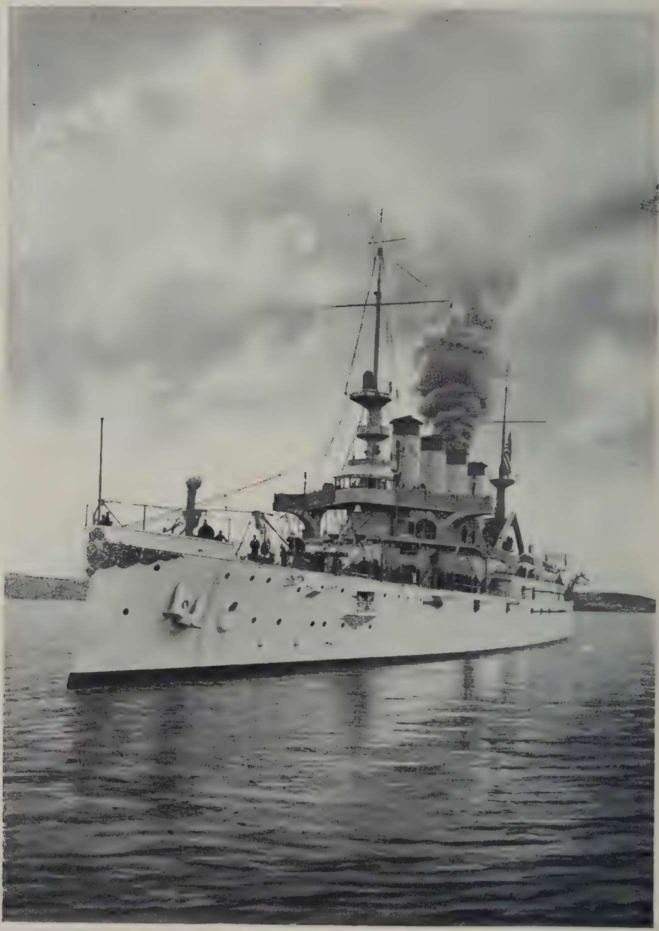
U. S. S. "MAINE," BATTLESHIP

Length, 388 ft. Beam, 72 ft. Draft, 23 ft. 6 in. Displacement, 12,370 tons.
Contract speed, 18.0 knots. Speed on trial, 18.0.



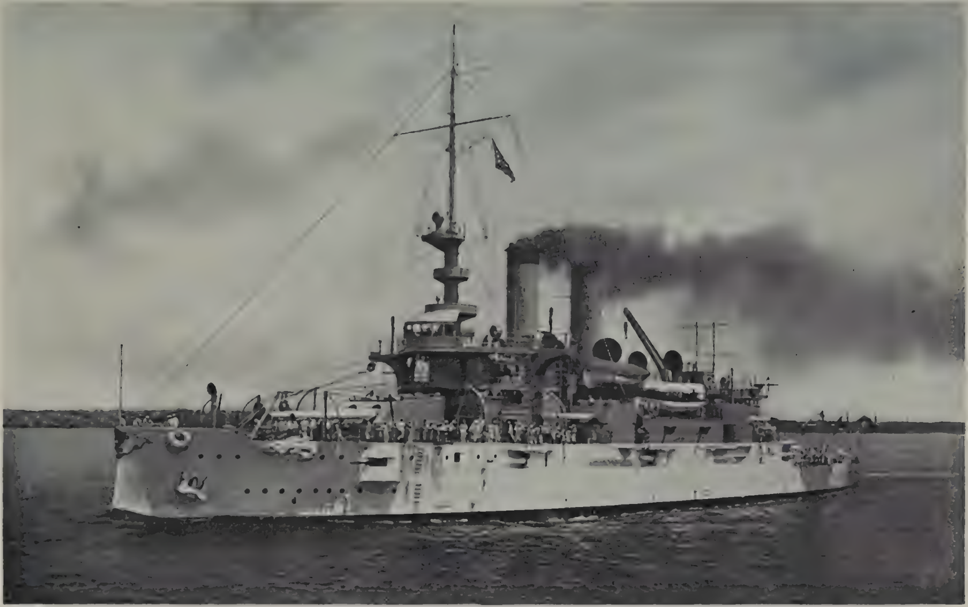
U. S. S. "PENNSYLVANIA," ARMORED CRUISER

Length, 502 ft. Beam, 69 ft. 6 in. Draft, 24 ft. 1 in. Displacement, 13,810 tons.
Contract speed, 22.0 knots. Speed on trial, 22.44 knots.



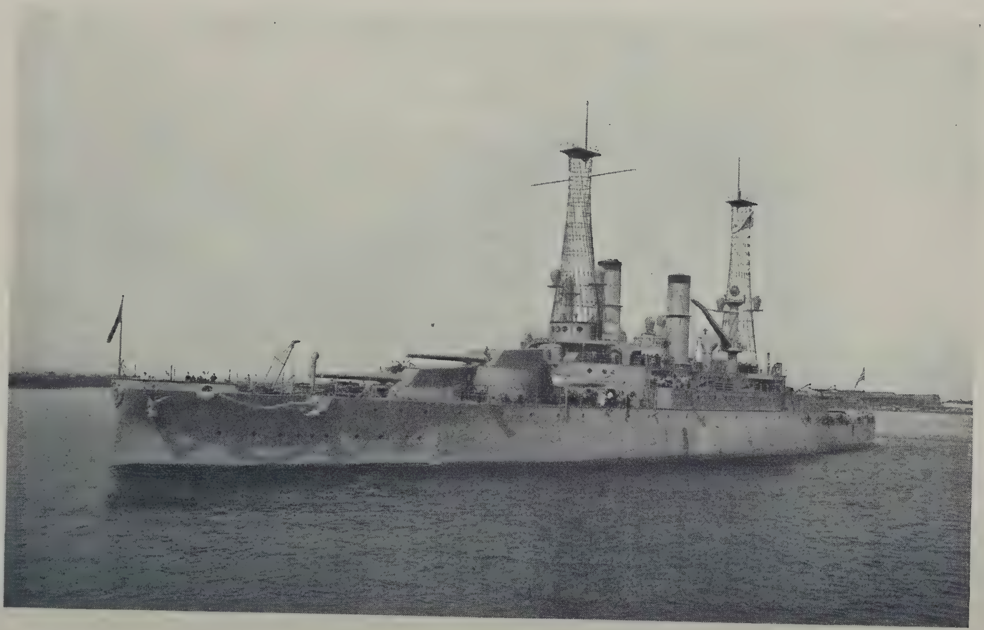
U. S. S. "TENNESSEE," ARMORED CRUISER

Length, 502 ft. Beam, 72 ft. 6 in. Draft, 25 ft. Displacement, 14,500 tons. Contract speed, 22.0 knots. Speed on trial, 22.16 knots.



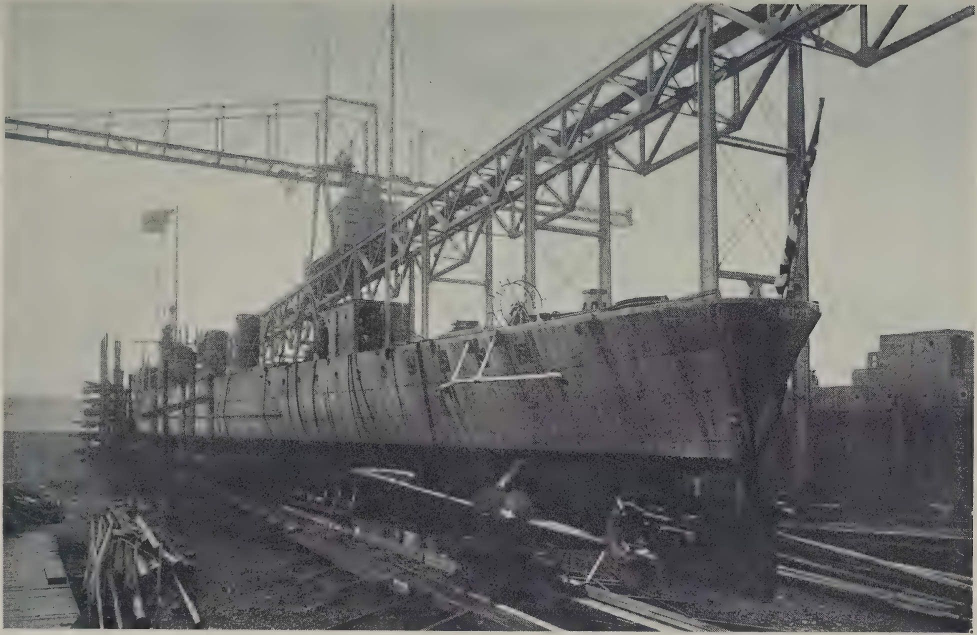
U. S. S. "MISSISSIPPI," BATTLESHIP

Length, 375 ft. Beam, 77 ft. Draft, 24 ft. 8 in. Displacement, 13,000 tons.
Contract speed, 17.0 knots. Speed on trial, 17.11 knots.



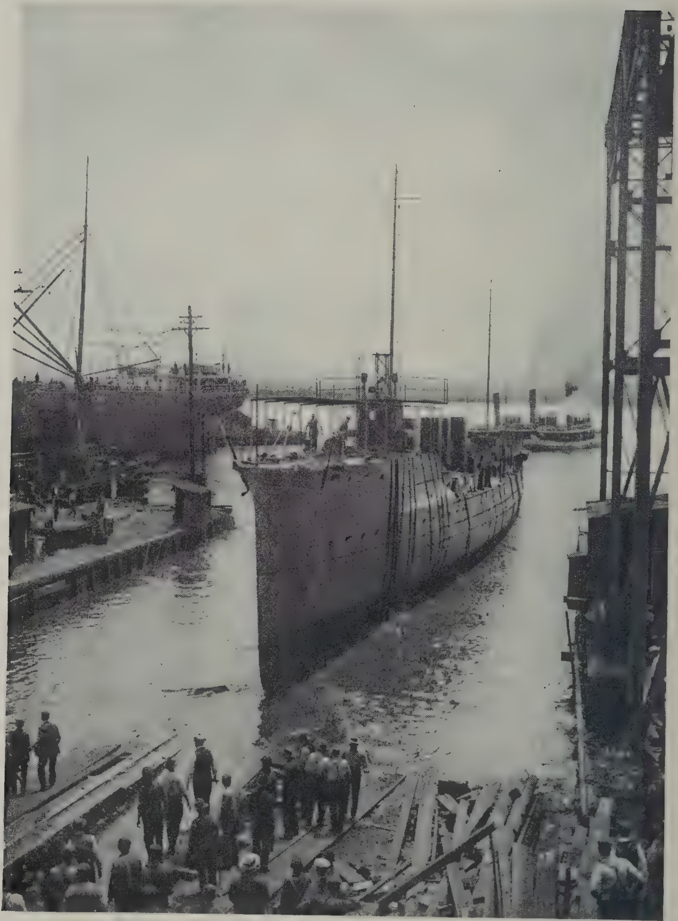
U. S. S. "SOUTH CAROLINA," BATTLESHIP

Length, 450 ft. Beam, 80 ft. Draft, 24 ft. 6 in. Displacement, 16,000 tons.
Contract speed, 18.5 knots. Speed on trial, 19.25 knots.



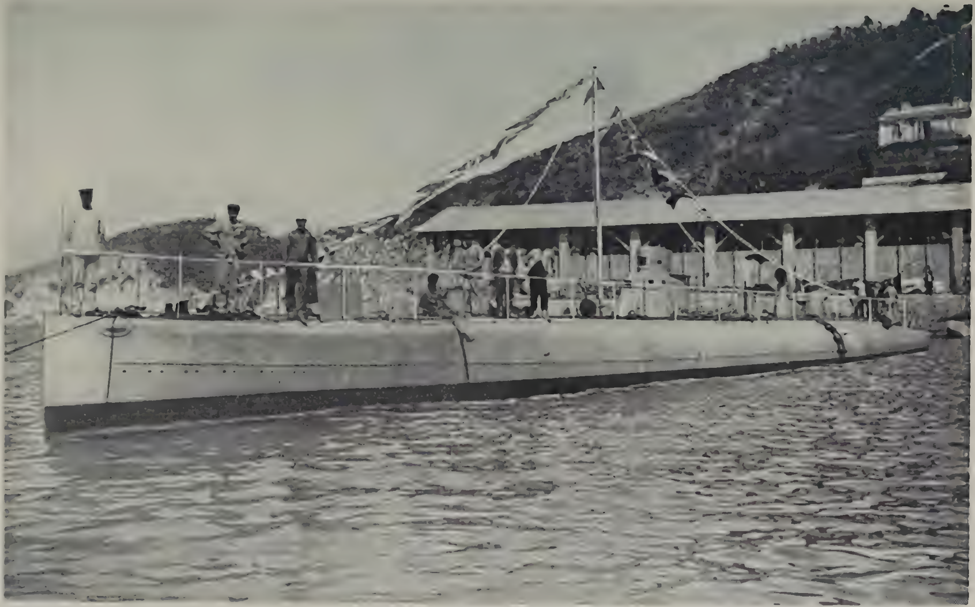
U. S. S. "JOSEPH B. SMITH," TORPEDO BOAT DESTROYER

Length, 289 ft. Beam, 26 ft. Draft, 8 ft. Displacement, 700 tons.
Contract speed, 28.0 knots. Speed on trial, 31 knots.



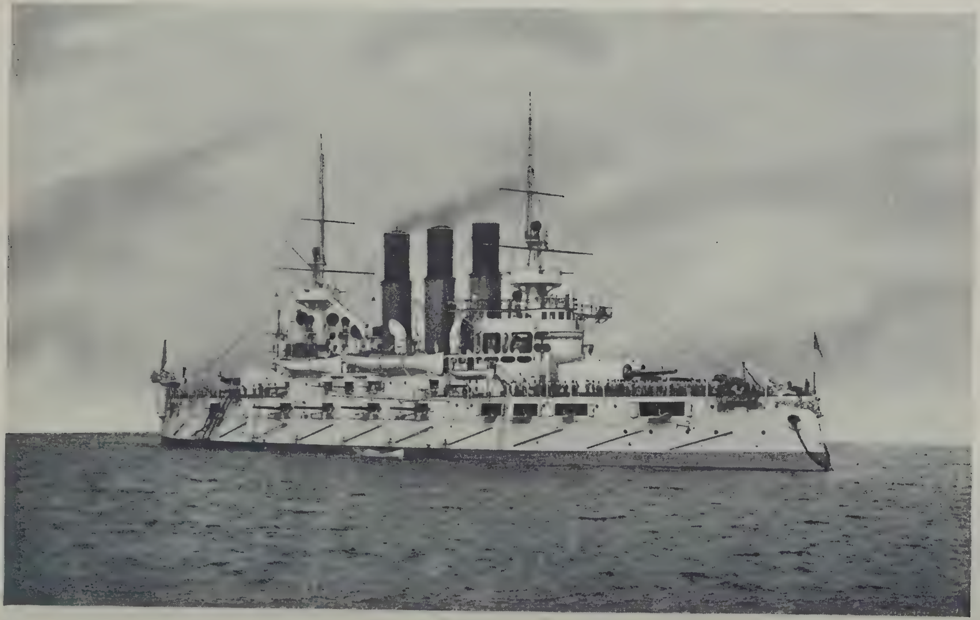
U. S. S. "ROSWELL H. LAMSON," TORPEDO BOAT DESTROYER

Length, 289 ft. Beam, 26 ft. 2 in. Draft, 8 ft. Displacement, 700 tons.
Contract speed, 28.0 knots.



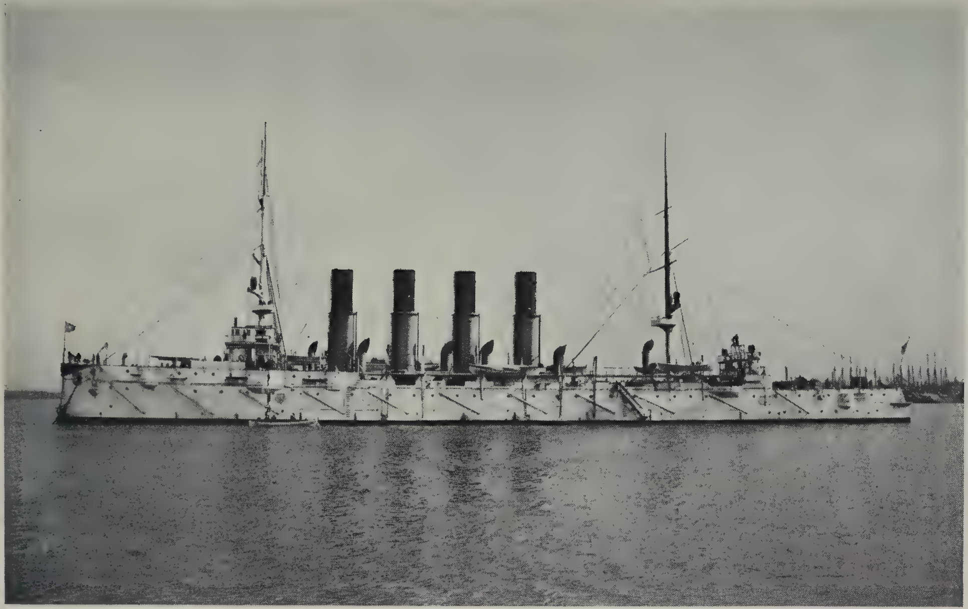
ITALIAN SUBMARINE "FOCA"

Same type as U. S. S. "Thrasher."



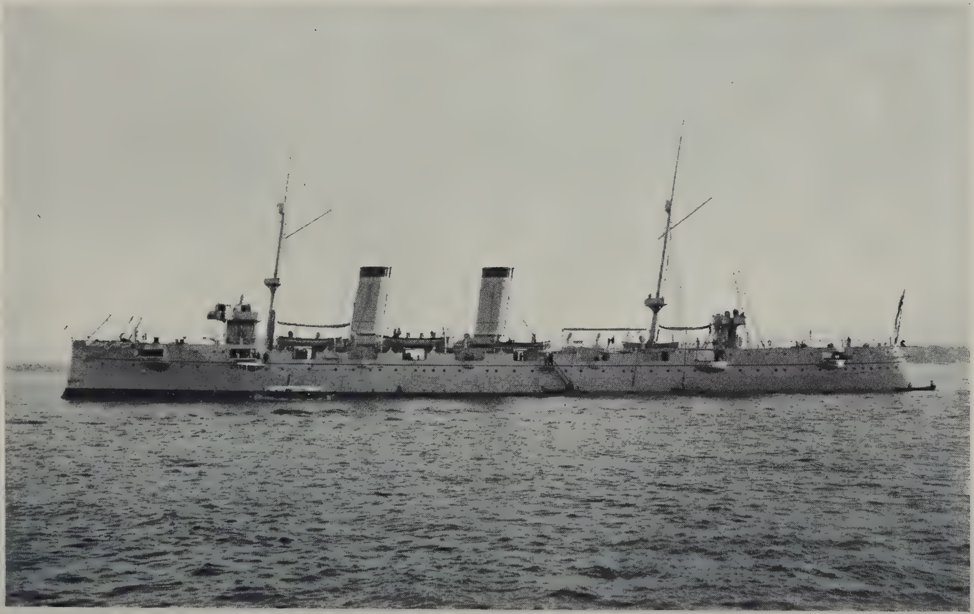
"RETVIZAN," BATTLESHIP, IMPERIAL RUSSIAN NAVY

Length, 384 ft. Beam, 72 ft. 2 in. Draft, 24 ft. 6 in. Displacement, 12,750 tons.
Contract speed, 18.0 knots. Speed on trial, 18.0 knots.



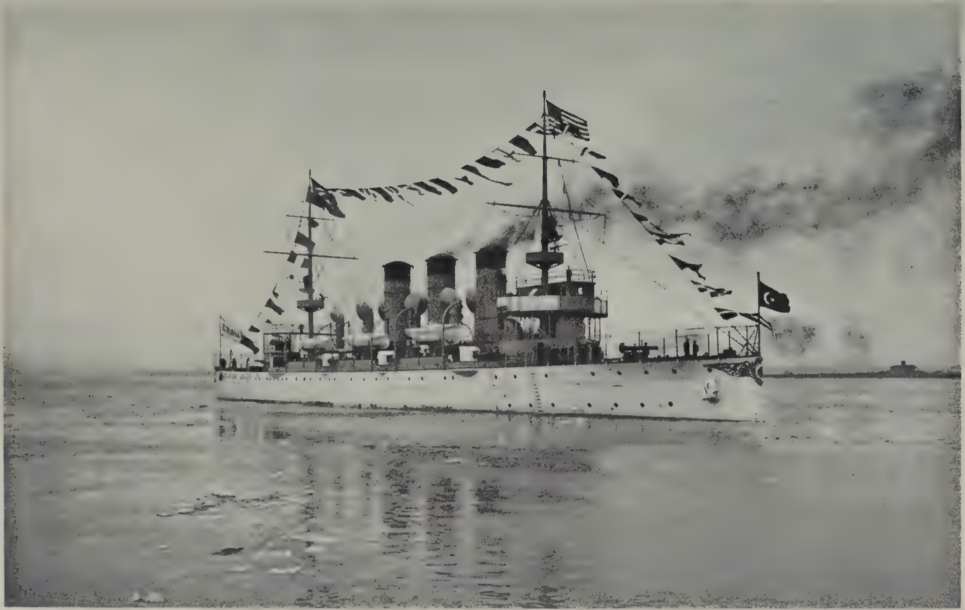
"VARIAG," PROTECTED CRUISER, IMPERIAL RUSSIAN NAVY

Length, 420 ft. Beam, 52 ft. Draft, 19 ft. 6 in. Displacement, 6500 tons.
Contract speed, 23.0 knots. Speed on trial, 23.25 knots.



"**KASAGI,**" **PROTECTED CRUISER, IMPERIAL JAPANESE NAVY**

Length, 374 ft. 6 in. Beam, 48 ft. 9 in. Draft, 17 ft. 9 in. Displacement, 5415 tons.
Contract speed, 22.5 knots. Speed on trial, 22.75 knots.



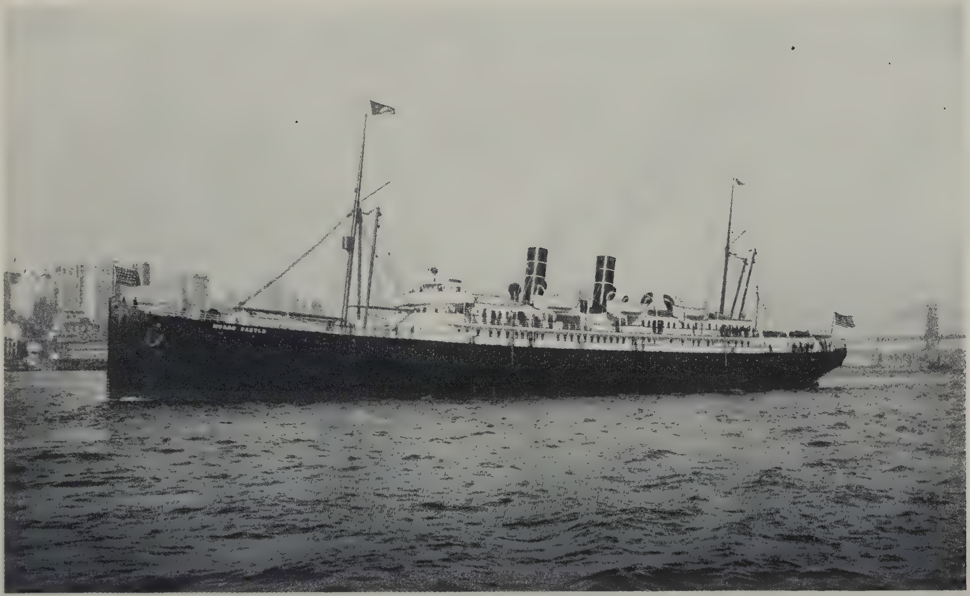
"MEDJIDIA," PROTECTED CRUISER. IMPERIAL OTTOMAN NAVY

Length, 330 ft. Beam, 42 ft. Draft, 16 ft. Displacement, 3300 tons.
Contract speed, 22.0 knots. Speed on trial 22.4 knots.

S. S. "ST. LOUIS," AMERICAN LINE

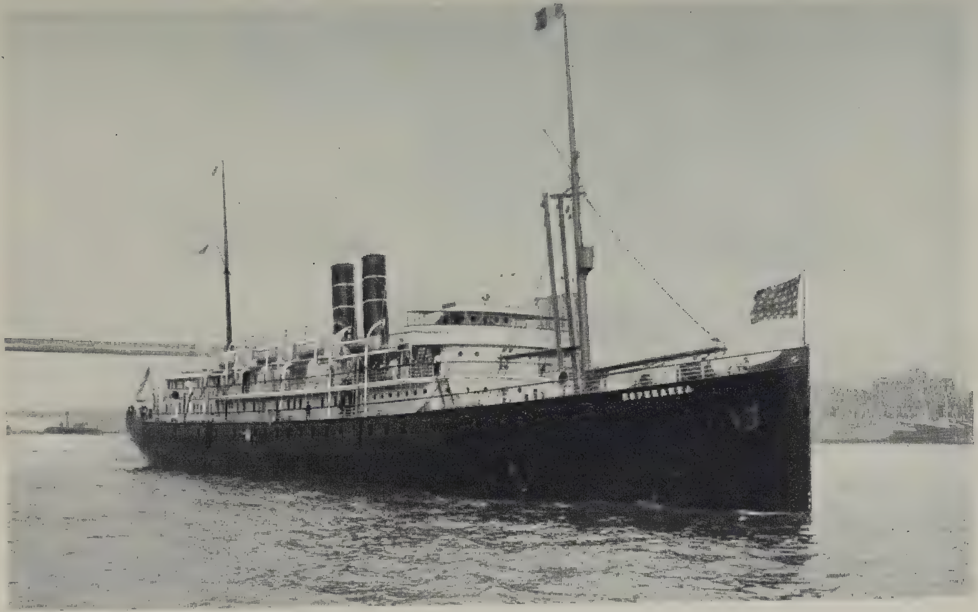
Gross Tonnage, 10,700 tons.

S. S. "KROONLAND," RED STAR LINE
Gross Tonnage, 12,500 tons.



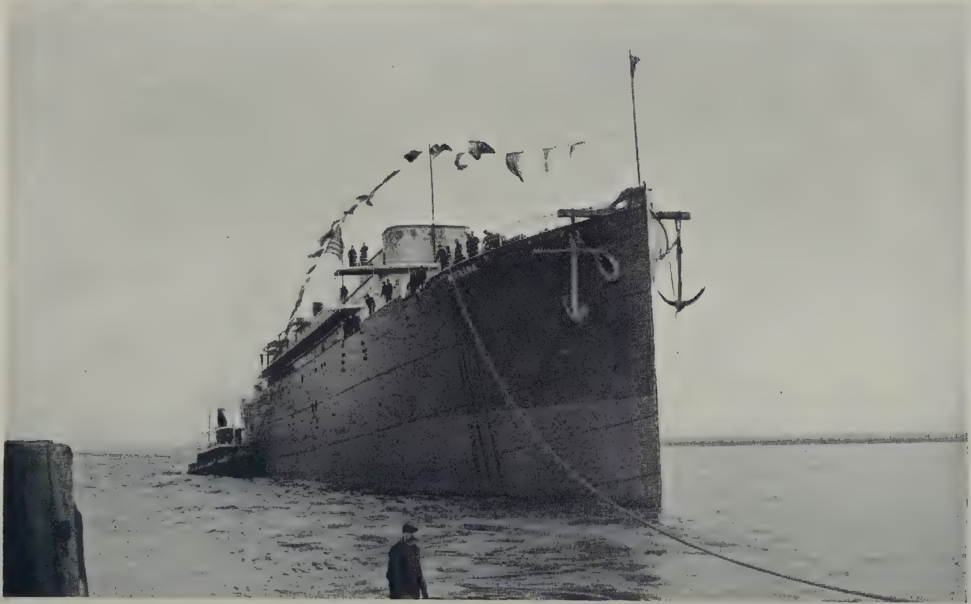
S. S. "MORRO CASTLE," NEW YORK & CUBA MAIL S. S. CO.

Gross Tonnage, 6000 tons. Contract speed, 18.0 knots. Speed on trial, 18.0 knots.



S. S. "ESPERANZA," NEW YORK & CUBA MAIL S. S. CO.

Gross Tonnage, 4700 tons. Contract speed, 17.0 knots. Speed on trial, 18.47 knots.

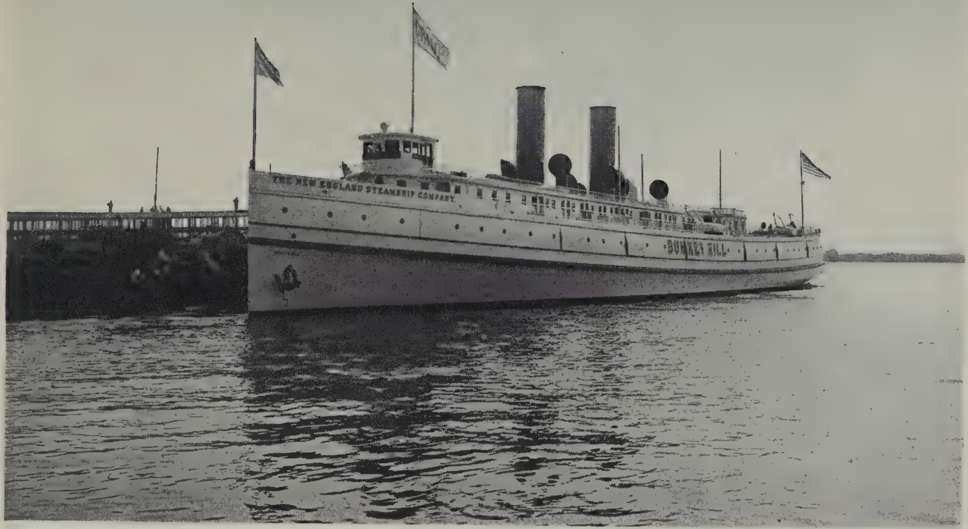


S. S. "MERIDA," NEW YORK & CUBA MAIL S. S. CO.

Gross Tonnage, 6200 tons. Contract speed, 16.0 knots. Speed on trial, 18.75 knots.

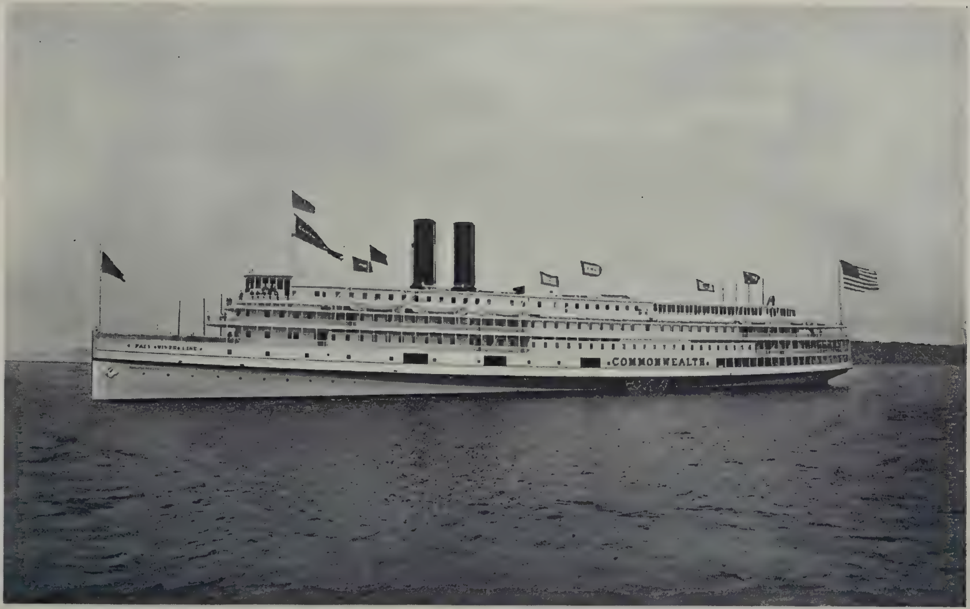
S. S. "HAVANA," NEW YORK & CUBA MAIL S. S. CO.
Gross Tonnage, 6390 tons. Contract speed, 16.0 knots. Speed on trial, 18.22 knots.

S. S. "CHIPPEWA," CLYDE LINE
Gross Tonnage, 2696 tons.



S. S. "BUNKER HILL," NEW ENGLAND NAVIGATION CO.

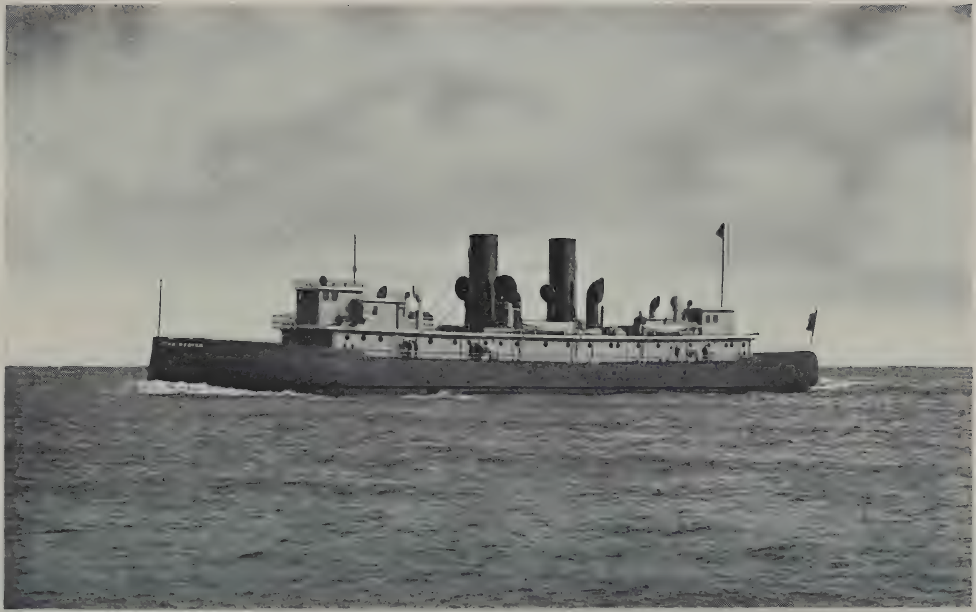
Gross Tonnage, 4029 tons. Speed on trial, 19.93 knots.



S. S. "COMMONWEALTH," NEW ENGLAND NAVIGATION CO.

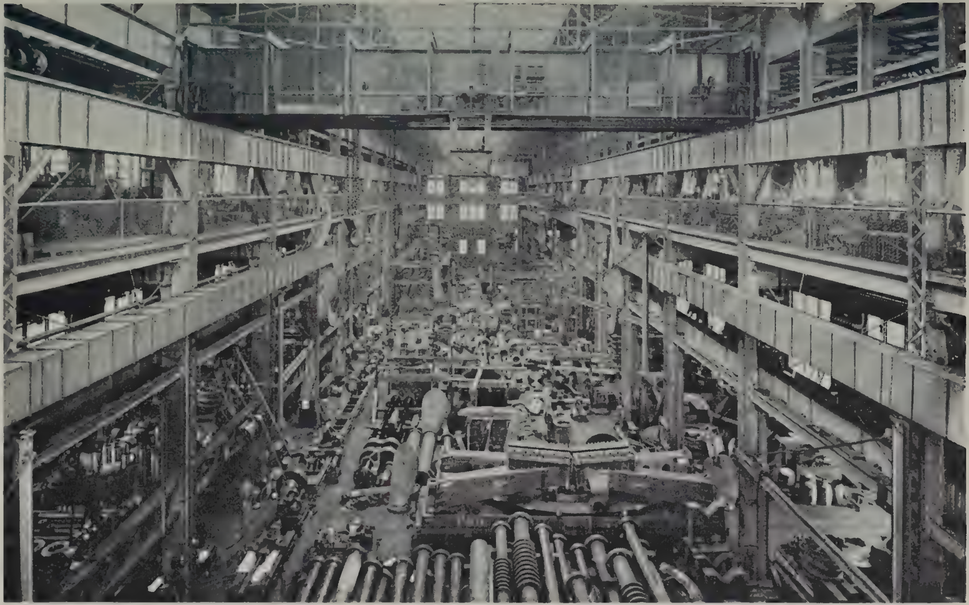
Gross Tonnage, 6350 tons. Speed on trial, 23.09 miles.

S. S. "MOMUS," SOUTHERN PACIFIC COMPANY
Gross Tonnage, 6878 tons.



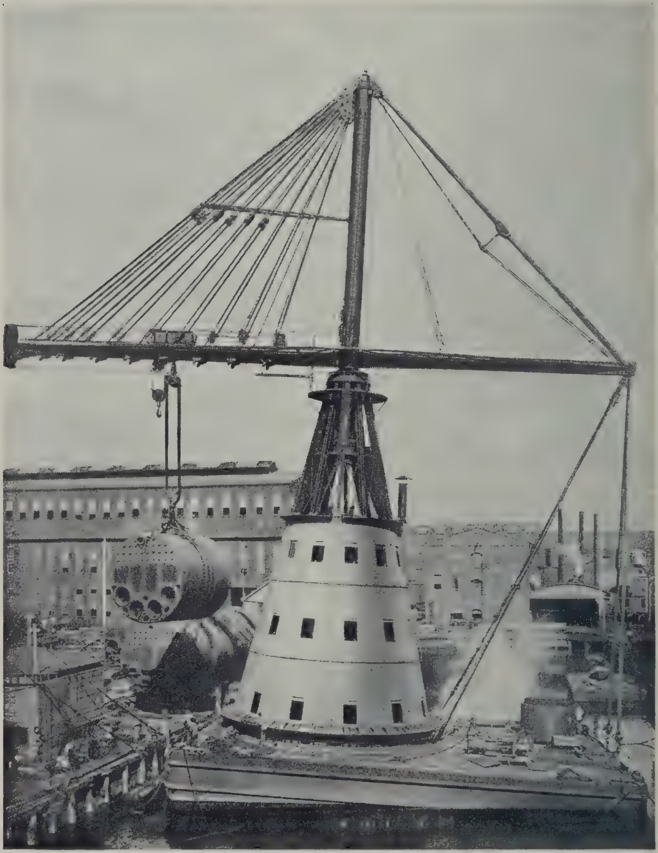
S. S. "JOHN WEAVER," CITY OF PHILADELPHIA

Ice Breaker.



INTERIOR OF MACHINE SHOP

333 feet long 143 feet wide. 88,000 square feet of floor space.



"ATLAS," FLOATING DERRICK

Capacity, 125 tons. Lifting 110 ton boiler.

I. P. MORRIS COMPANY

1828

OFFICERS

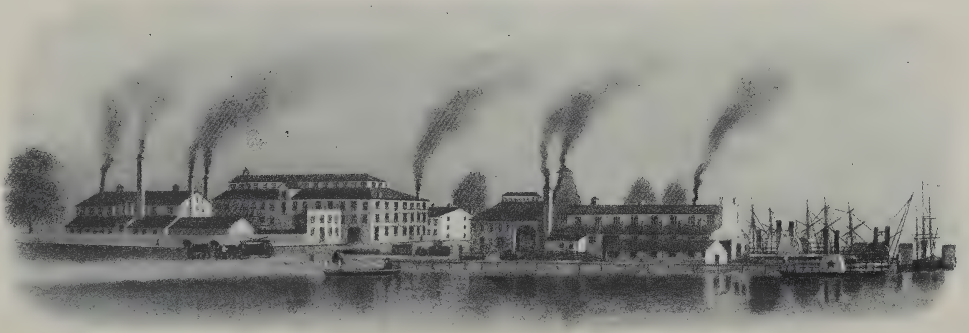
HENRY S. GROVE
President

HARRY W. HAND
Vice-President and General Manager

CHARLES T. TAYLOR
Secretary and Treasurer

DIRECTORS

CHARLES H. CRAMP
HENRY S. GROVE
WM. M. POTTS
ALBERT STRAUSS
GEO. H. McFADDEN



I. P. MORRIS COMPANY'S WORKS, 1852

Introduction

THE Iron Works of the I. P. Morris Company is one of the oldest machinery building organizations in the United States. Its business was instituted in 1828 at the corner of Market Street and Schuylkill 7th, now Sixteenth Street, under the firm name of Levi Morris & Company. In 1841, the name was changed to the I. P. Morris Company, and in 1847 the present site for the works was purchased, the Company being known as the Port Richmond Iron Works. Late in 1875 the Company was incorporated.

In 1891 the control passed to the William Cramp & Sons Ship & Engine Building Company and on July 1st of that year Mr. John T. Morris was succeeded in the presidency by Mr. Charles H. Cramp, who was succeeded in turn by Mr. Henry S. Grove in 1903.

From the organization of the Company the principal line of work has been the production of heavy castings and machinery of a miscellaneous character requiring special designs and the highest class of engineering for its satisfactory performance. For greater convenience in handling this varied business the company has been divided into two departments—the Mechanical Engineering Department and the Hydraulic Department.

I. P. Morris Company
Mechanical Engineering Department

It would be quite impracticable to attempt a detailed account of the various items of work which this department has performed. In the following pages various items are referred to by table and illustration. In these paragraphs only such mention is made as to indicate, in a very general way, the scope and variety of the company's products.

Up to the time of the Civil War the principal work of the company was the construction of steam engines and sugar mill machinery. From 1861 to 1869 it built the main propelling engines, together with a number of their auxiliaries, for the gunboats Itasca and Scioto, the monitors Langamon and Lehigh, the first Monadnock and Agamenticus, the sloop-of-war Pushmatah, and the steamer Tacony —all for the U. S. Navy. Some of these engines were very large for their day, particularly those for the Pushmatah, which were 60-inch cylinders by 36-inch stroke.

In 1894 a Leavitt compound vertical inverted beam flywheel pumping engine was built for the Water Company of Louisville, Ky., and in 1902 a triple expansion beam, flywheel engine from the same designer, operating two single acting pumps, was built for the City of Boston Sewage Plant. These pumps held the world's record for several years as the most economical steam engines, with a coal consumption of only about one and one-tenth pounds per horse power hour.

The I. P. Morris Company is particularly well known for its boiler work. Among the large number built may be mentioned the boilers for the Boston Sewage and Pumping Station Power Plant, the boilers for the Bureau of Filtration, Lardner's Point Pumping Station, and Belmont Filter Plant, Philadelphia; special boiler economizers for the United Gas Improvement Company, installed at Philadelphia and at Waterbury, Conn.; and the marine type of boilers built for the Southern Pacific Steamships Momus and Antilles. These last were the heaviest marine boilers ever built in the United States. In addition to these a great many sets of special evaporating apparatus have been manufactured. These are built of copper, plate steel or cast iron, with diameters of more than nine feet and lengths of more than fifteen feet.

For the Kirschner Rotary Oil Press Company a special rotary hydraulic oil press was constructed, operating under a pressure of about 4,000 pounds per square inch.

This Company built the first Parsons Marine steam turbines installed by the William Cramp & Sons Ship & Engine Building Company, consisting of two low pressure and astern turbines for the steamer Old Colony. These, combined with the high pressure turbine, gave a horse-power of about 10,000.

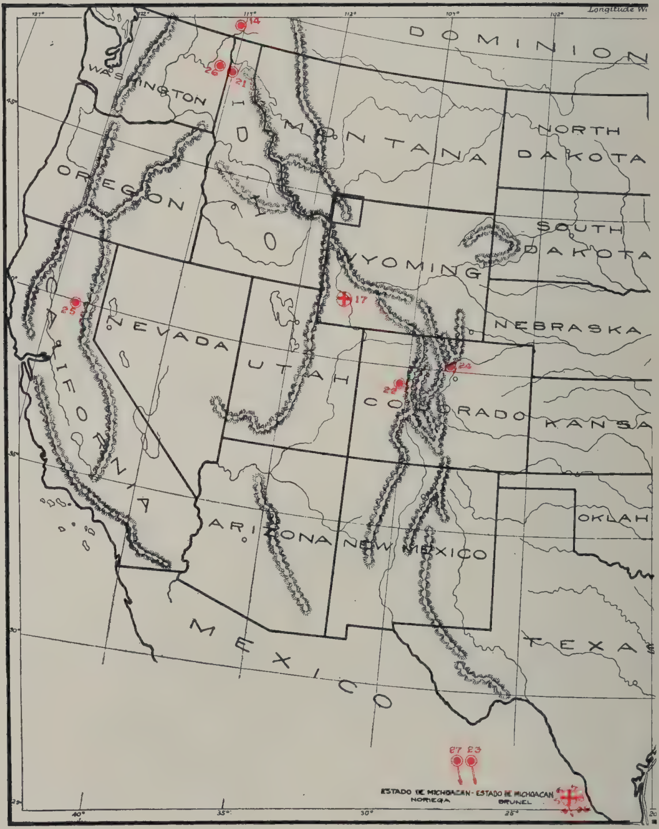
I. P. Morris Company
Hydraulic Department

The first hydraulic turbine work undertaken by the company was the construction of seven turbines of the Geyelin type, for the Fairmount Waterworks of the city of Philadelphia. The first unit was installed in 1851 and was among the earliest turbines built in the United States. These turbines were operated continuously until 1908, when the new filtration station was completed. The Geyelin turbines, however, are at the present time ready for use should occasion arise.

The building of the turbines for the first installation of the Niagara Falls Power Company was entrusted to the I. P. Morris Company by a Commission of International Engineers, organized for the purpose of considering designs of machinery for utilizing the power of Niagara Falls. This work was so satisfactory that the company was awarded the contract for the units in the station known as Wheelpit No. 2 of the Niagara Falls Power Company, and was awarded the contract for two wheels in the plant of the Canadian Niagara Power Company.

When recent tests were made on the 10,000 horse-power turbine wheels for the Niagara Falls Hydraulic Power & Manufacturing Company, and the 750 horse-power wheels for the Porto Rico Railway & Light Company, it was shown that the I. P. Morris Company has secured the highest efficiencies ever obtained with turbines in commercial service. Both tests show the efficiencies to be well above 90 per cent.

In the year 1904, the work of the Company in hydraulic machinery had reached such proportions that a special department was organized and a corps of engineers engaged for the design of hydraulic turbines and centrifugal pumping machinery. This company was asked by the McCall Ferry Power Company to furnish competitive designs with European concerns and proof of its efficiency is the award of the contract for these wheels upon the excellence of the designs it furnished.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DOMINION
WASHINGTON
IDAHO
MONTANA
NORTH DAKOTA
SOUTH DAKOTA
OREGON
WYOMING
NEBRASKA
NEVADA
UTAH
COLORADO
KANSAS
CALIFORNIA
ARIZONA
NEW MEXICO
OKLAH
TEXAS
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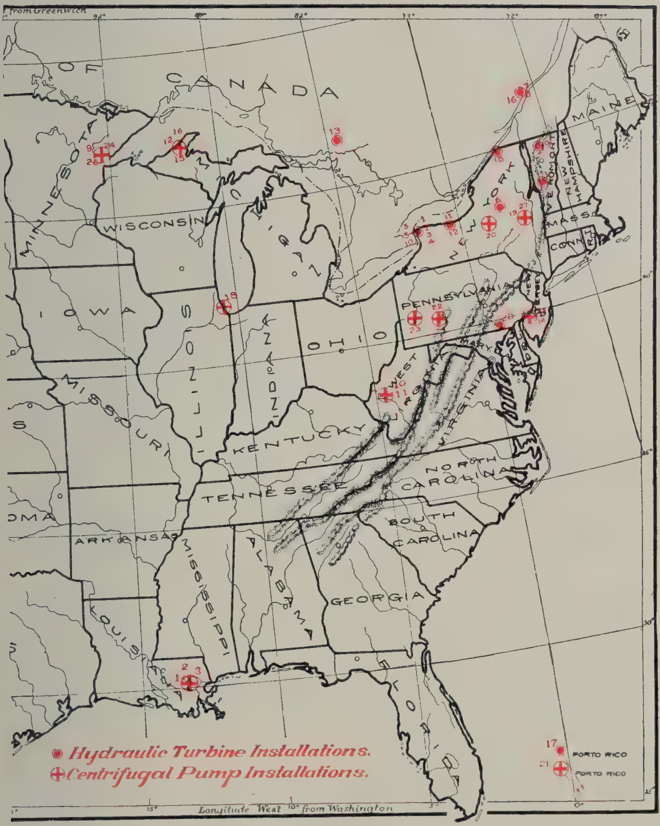
ESTADO DE MICHOACAN - ESTADO DE MICHOACAN
NORIEGA
BRUNEL



from Greenwich
92°
82°
77°
72°
67°
OF CANADA
MINNESOTA
WISCONSIN
MICHIGAN
IOWA
ILLINOIS
INDIANA
OHIO
MISSOURI
KENTUCKY
TENNESSEE
ARKANSAS
MISSISSIPPI
ALABAMA
GEORGIA
LOUISIANA
FLORIDA
NEW YORK
PENNSYLVANIA
NEW JERSEY
VERMONT
NEW HAMPSHIRE
MAINE
MASS.
CONN.
R.I.
WEST VIRGINIA
VIRGINIA
NORTH CAROLINA
SOUTH CAROLINA
PORTO RICO
PORTO RICO
40°
35°
30°
25°
15°
10°
5°
0°
Longitude West from Washington
● Hydraulic Turbine Installations.
⊕ Centrifugal Pump Installations.

TURBINE WHEELS BUILT BY I. P. MORRIS COMPANY

Purchaser	Head	Number of Units	R. P. M.	Unit Capacity	Total Capacity	Date of Completion
1 Niagara Falls Power Co., Niagara Falls, N. Y.	136 ft.	10	250	5.000 H.P.	50.000 H.P	1895-1900
2 Niagara Falls Power Co., Station No. 2, Niagara Falls, N. Y.	148 "	11	250	5,500 H.P.	60,500 H.P.	1902-1904
3 Niagara Falls Hyd. Pr. & Mfg. Co., Niagara Falls, N. Y.	210 "	5	250	2,900 H.P.	14,500 H.P.	1901
4 Niagara Falls Hyd. Pr. & Mfg. Co., Station No. 2, Niagara Falls, N. Y.	210 "	4	250	2.300 H.P.	9.200 H.P.	1901
5 Canadian Niagara Power Co., Niagara Falls, Canada.	145 "	2	250	10.000 H.P.	20.000 H.P.	1905
6 Utica Gas & Electric Co., Utica, N. Y.	266 "	4	360	2,000 H.P.	8.000 H.P.	1901-1905
7 Shawinigan Water & Power Co., Shawinigan Falls, Province of Quebec, Canada	125 "	2	180	6,000 H.P.	12.000 H.P.	1902-1904
8 Shawinigan Water & Power Co., Shawinigan Falls, Province of Quebec, Canada	135 "	3	180	10,500 H.P.	31,500 H.P.	1904-06-09
9 Vermont Power & Mfg. Co., Fairfax Falls, Vt.	82 "	3	600	750 H.P.	2,250 H.P.	1904
10 Vermont Marble Co., Proctor, Vt.	120 "	3	514	1.200 H.P.	3.600 H.P.	1905
11 Rochester Railway & Light Co., Rochester, N. Y.	93 "	2	400	900 H.P.	1.800 H.P.	1904
12 Rochester Railway & Light Co., Rochester, N. Y.	93 "	2	327	2.100 H.P.	4.200 H.P.	1904
13 Huronian Co., Turbine, Ontario	85 "	3	375	3,550 H.P.	10,650 H.P.	1905-1908
14 West Kootenay Power & Lt. Co., East Bonnington Falls, British Columbia	70 "	2	180	8,000 H.P.	16.000 H.P.	1906
15 Toronto Power Company, Ltd. (Electrical Development Co.), Niagara Falls, Canada	133 "	4	250	13,000 H.P.	52,000 H.P.	1906-1907
16 Northern Aluminum Co., Shawinigan Falls, Province of Quebec, Canada	133 "	5	250	6.625 H.P.	33.125 H.P.	1906
17 J. G. White & Co., Inc., Porto Rico	175 "	4	450	750 H.P.	3.000 H.P.	1907

TURBINE WHEELS BUILT BY I. P. MORRIS COMPANY—CONTINUED

PURCHASER	HEAD	NUMBER OF UNITS	R. P. M.	UNIT CAPACITY	TOTAL CAPACITY	DATE OF COMPLETION
18 St. Lawrence River Power Co., Massena, N. Y. . .	30 ft.	4	140	6,000 H.P.	24,000 H.P.	Not completed
19 Niagara Falls Hyd. Pr. & Mfg. Co., Station No. 3, Niagara Falls, N. Y.	210 "	6	300	10,000 H.P.	60,000 H.P.	1907-1908
20 McCall Ferry Power Co., McCall Ferry, Penna. . . .	53 "	6	94	13,500 H.P.	81,000 H.P.	Not completed
21 Washington Water Power Co. (Post Falls Plant), Post Falls, Idaho	45 "	1	138	3,260 H P.	3,260 H.P.	1907
22 Central Colorado Power Co., Glenwood, Col.	160 "	2	400	9,000 H.P.	18,000 H.P.	1908
23 Michoacan Power Co., State of Michoacan, Mexico .	160 "	2	514	2,750 H.P.	5,500 H.P.	1908
24 Central Colorado Power Co., Boulder, Col. . . . . (Impulse type)	1800 "	2	400	10,500 H.P.	21,000 H.P.	Not completed
25 Great Western Power Co., Oroville, Cal.	525 "	4	400	18,000 H.P.	72,000 H.P.	1909
26 Washington Water Power Co. (Little Falls Plant), Spokane, Wash.	66 "	4	150	9,000 H.P.	36,000 H.P.	Not completed
27 Michoacan Power Co. (Noreiga Development), State of Michoacan, Mexico	670 "	2	514	6,000 H.P.	12,000 H.P.	Not completed
28 Niagara Falls Hydraulic Pr. & Mfg. Co., Niagara Falls, N. Y.	210 "	1	300	10,000 H.P.	10,000 H.P.	1909
29 Niagara Falls Hydraulic Pr. & Mfg. Co. Niagara Falls, N. Y.	210 "	2	300	10,000 H.P.	20,000 H.P.	Not completed

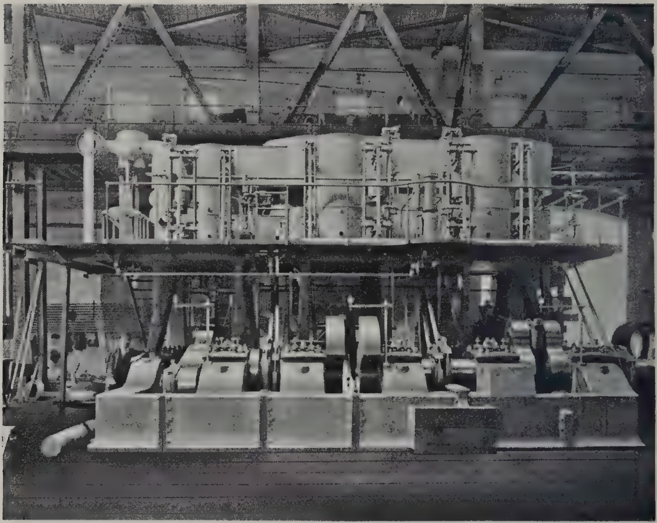
Total H.P. of turbines built or under construction by the I. P. Morris Company (1909), 700,000

PRINCIPAL INSTALLATIONS OF CENTRIFUGAL PUMPS BUILT BY I. P. MORRIS COMPANY

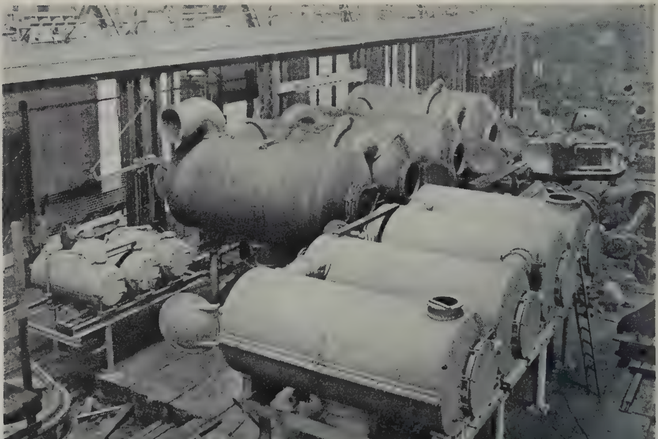
Purchaser	Number of Units	Type	Total Head	TotalCap. each pump Gals. per 24 Hours	Date of Completion
1 City of New Orleans (Metaire Sta.) New Orleans, La.	1 Motor Driven Pump	Single Stage	10 ft.	207,000,000	1899
2 City of New Orleans (St. Benard Sta.), New Orleans, La.	1 " " "	" "	12 "	38,800,000	1903
3 City of New Orleans, New Orleans, La.	2 " " "	" "	8 "	181,000,000	1903
4 Mexican Lt. & Pr. Co., Sta. No. 1 City of Mexico	3 " " "	" "	185 "	19,400,000	1908
5 Mexican Lt. & Pr. Co., Sta. No. 2 City of Mexico	2 " " "	" "	21 "	6,860,000	1907
6 Mexican Lt. & Pr. Co., Sta. No. 3 City of Mexico	2 " " "	" "	26 "	13,730,000	1909
7 Mexican Lt. & Pr. Co., Sta. No. 4 City of Mexico	2 " " "	" "	31 "	14,800,000	Not finished
8 Mexican Lt. & Pr. Co., Sta. No. 5 City of Mexico	2 " " "	" "	49 "	21,150,000	Not finished
9 Gen. Elec. Co. (for Duluth Water Works), Duluth, Minn.	1 " " "	Multi-Stage	328 "	13,500,000	1907
10 Gen. Elec. Co. (for Kanawha Water & Lt. Co.), Charleston, W. Va.	2 " " "	Single Stage	60 "	5,000,000	1907
11 Gen. Elec. Co. (for Kanawha Water & Lt. Co.), Charleston, W. Va.	1 " " "	" "	40 "	2,880,000	1907
12 Calumet & Hecla Mining Co. Calumet, Mich.	5 " " "	Multi-Stage	755 "	1,440,000	1907-1908
13 Gen. Elec. Co., (for West Jersey & Seashore R.R.Co.), Westville, N J.	3 Engine Driven Pumps	Single Stage	35 "	10,080,000	1906
14 Gen. Elec. Co., (for West Jersey & Seashore R.R.Co.), Westville, N.J.	1 Steam Turbine Driven Pump	Single Stage	35 "	10,080,000	1907
15 Gen. Elec. Co., (for Champion Copper Co.), Paynesdale, Mich.	7 Motor Driven Pumps	Multi-Stage	750 "	288,000	1907-1908

PRINCIPAL INSTALLATIONS OF CENTRIFUGAL PUMPS BUILT BY I. P. MORRIS COMPANY—CONTINUED

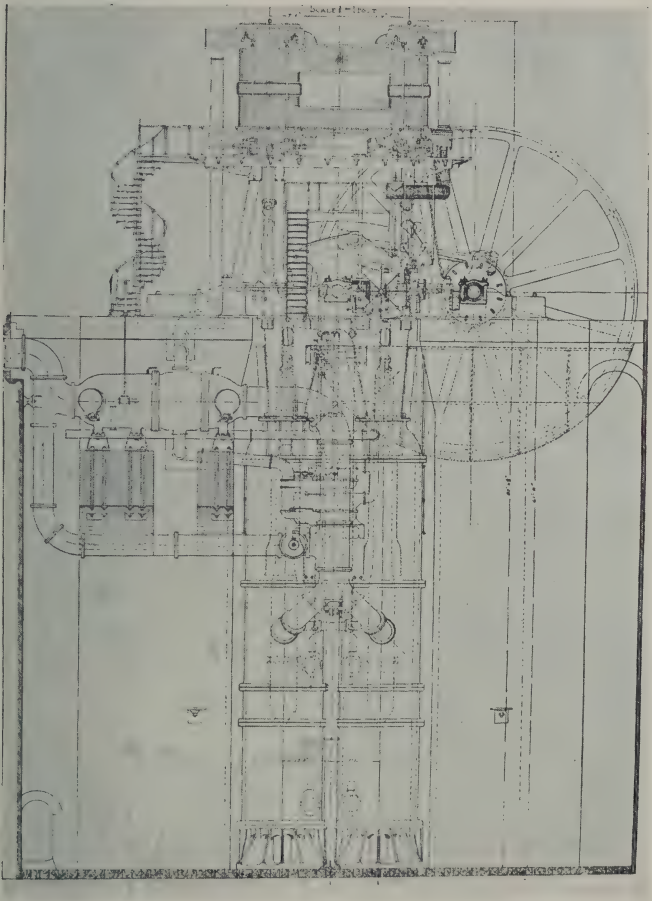
PURCHASER	NUMBER OF UNITS	TYPE	TOTAL HEAD	TOTAL CAP. EACH PUMP GALS. PER 24 HOURS	DATE OF COMPLETION
16 Calumet & Hecla Mining Co. (Lake Superior Works), Calumet, Mich.	1 Motor Driven Pump	Multi-Stage	820 ft	3,000,000	1908
17 Anaconda Copper Mining Co., Diamondville, Wyo.	1 " " "	" "	750 "	720,000	1907
18 Gen. Elec. Co. (City of Chicago Fire Boats), Chicago, Ill.	4 Steam Turbine Driven Pumps	" "	346 "	6,480,000	1908
19 Gen. Elec. Co., Schenectady, N. Y.	1 Motor Driven Pump	Single Stage	100 "	1,296,000	1908
20 Solvay Process Co., Syracuse, N. Y.	1 Steam Turbine Driven Pump	" "	170 "	25,000,000	1908
21 Guanica Centrale, Porto Rico. . . .	2 Motor Driven Pumps	" "	95 "	6,000,000	1908
22 Berwind-White Coal Mining Co., Wyndber, Penna.	2 " " "	Multi-Stage	330 "	5,760,000	1908-1909
23 Pressed Steel Car Co., McKees Rocks, Penna.	3 " " "	Single Stage	60 "	3,600,000	1908
24 Gen. Elec. Co. (for Duluth, Missabe & Northern Rwy. Co.) Duluth, Minn.	2 Steam Turbine Driven Pumps	Multi-Stage	346 "	8,640,000	1908
25 Mexican Lt. & Pr. Co. (for Necaxa), Mexico.	6 Motor Driven Pumps	Single Stage	130 "	5,700,000	1909
26 Westinghouse Elec. & Mfg. Co. (for Duluth, Missabe & Northern Rwy. Co.), Duluth, Minn.	1 " " "	Multi-Stage	585 "	1,440,000	Not finished
27 Gen. Elec. Co. (for Rotterdam Pumping Station, Schenectady), Schenectady, N. Y.	1 " " "	Multi-Stage	240 "	9,000,000	1906
28 Calumet & Hecla Mining Co., Calumet, Mich.	1 Rope Driven Pump	Single Stage	58 "	60,000,000	Not finished
29 Phillips Sheet & Tin Plate Co., Clarksburg, W. Va.	2 Motor Driven Pumps	Single Stage	135 "	4,900,000	Not finished



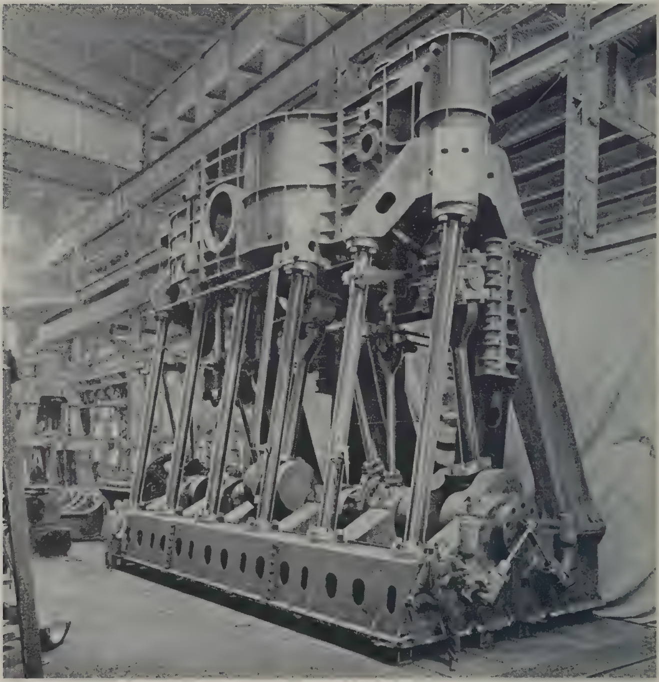
One of three Leavitt beam type compound hoisting engines for the Calumet & Hecla Mining Company. Three vertical cylinders; (one H. P. and two L. P.) 24 x 2 (40) x 48; 80 revolutions per minute. Built in 1900.



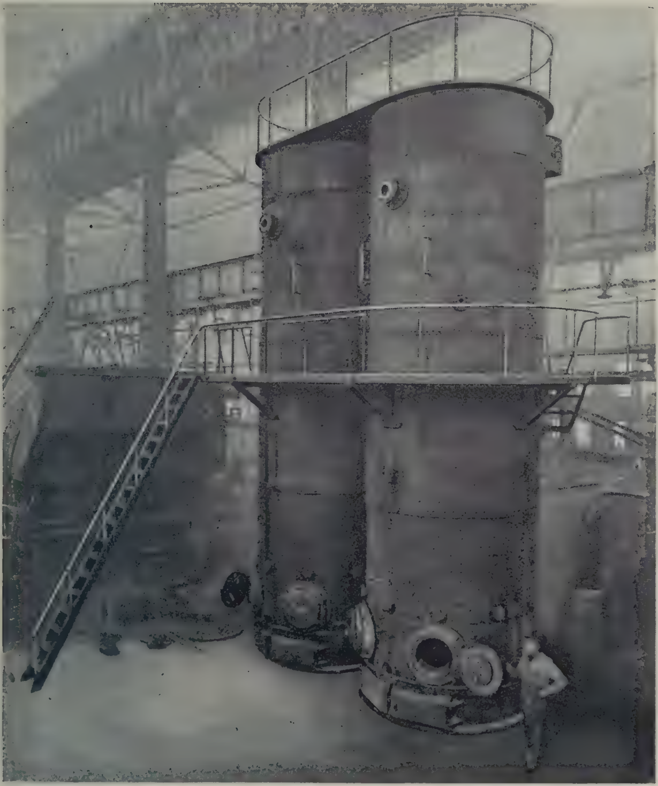
Lillie Evaporators.—Two quadruple and one triple effect; showing steel plate and copper construction.



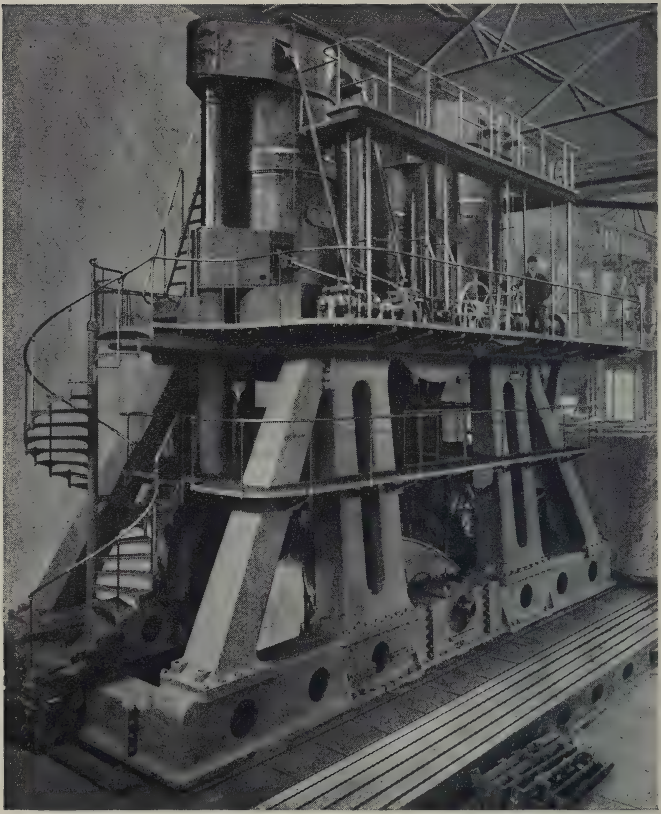
Side elevation—Leavitt compound, vertical, inverted beam and flywheel pumping engine for the Louisville Water Co., Louisville, Ky. Steam cylinders, 27″ x 54″ x 10′ 0″. Water plungers, 24$\frac{1}{16}$″ x 34″ x 7′ 0″. 16,000,000 gallons in 24 hours. Built in 1894.



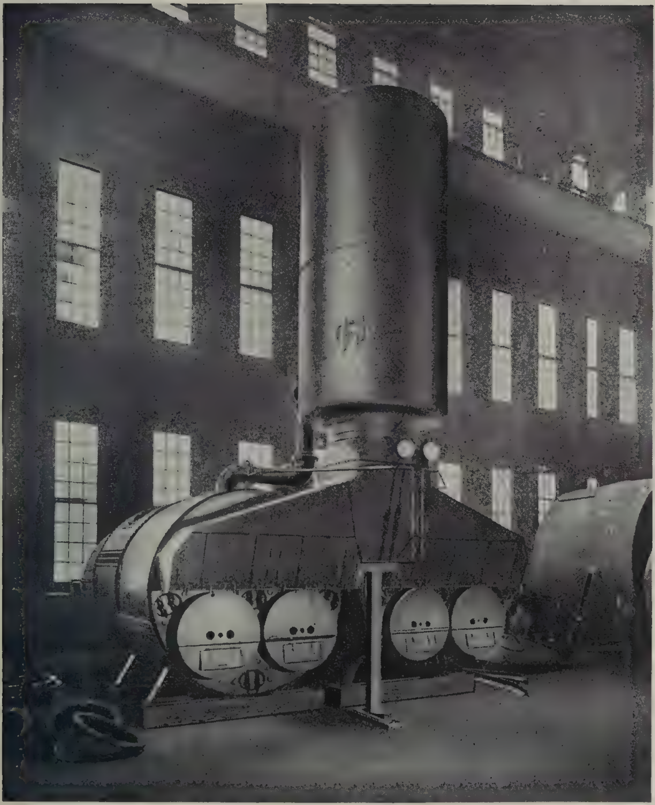
Main propelling engines, Southern Pacific Steamship "Momus."—Triple expansion, 34″ x 57″ x 104″ x 63″; 8000 H.P.



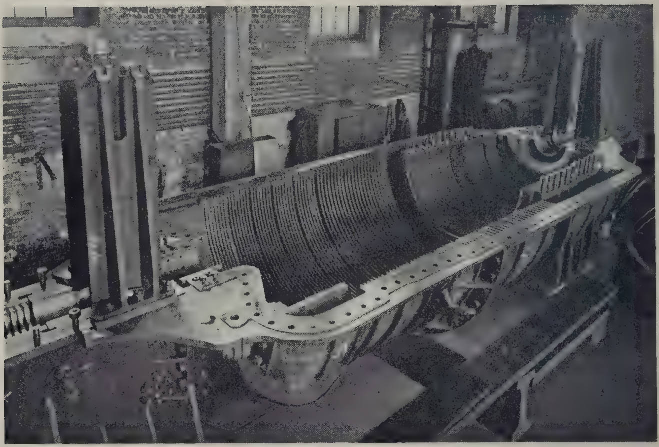
225 horse-power Dean vertical boilers for the Metropolitan Water & Sewage Board, Chestnut Hill High Service Pumping Station, Boston, Mass. 98″ diameter, 24′ 4⅜″ high, 185 pounds steam pressure.



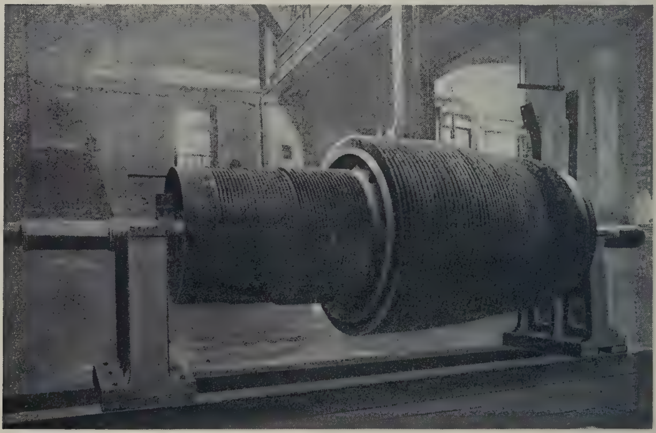
Leavitt triple expansion beam and fly wheel pumping engine for the Boston Sewage Pumping Station at Calf Pasture, Dorchester, Mass. Steam cylinders, 18½″ x 33″ x 52¾″ x 120″ stroke. Two water plungers 60″ diameter x 120″ stroke. 24,000,000 gallons in twenty-four hours. Pump ends not illustrated. Built in 1902.



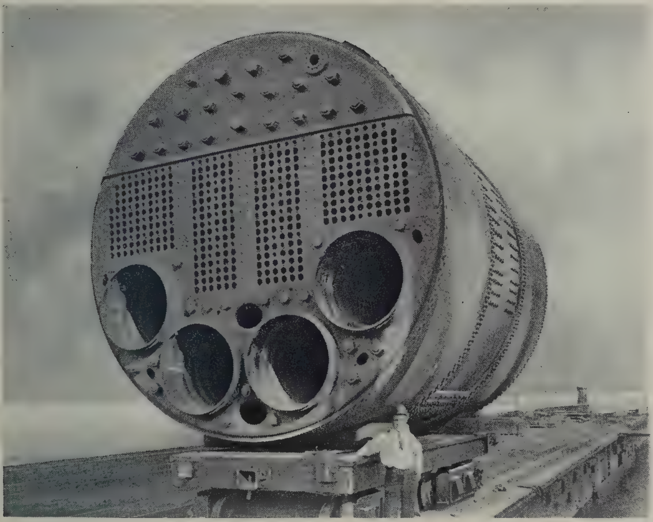
Boilers for S.S. "Tiburon," oil burning.—Built for the Abner Doble Company of San Francisco, Cal. Two 10′ 9″ x 16′ 10¾″ furnace flue and return tubular boilers, with steam chimney 7′ 9″ x 15′ 6″ for 90 lb. working pressure. Built in 1905.



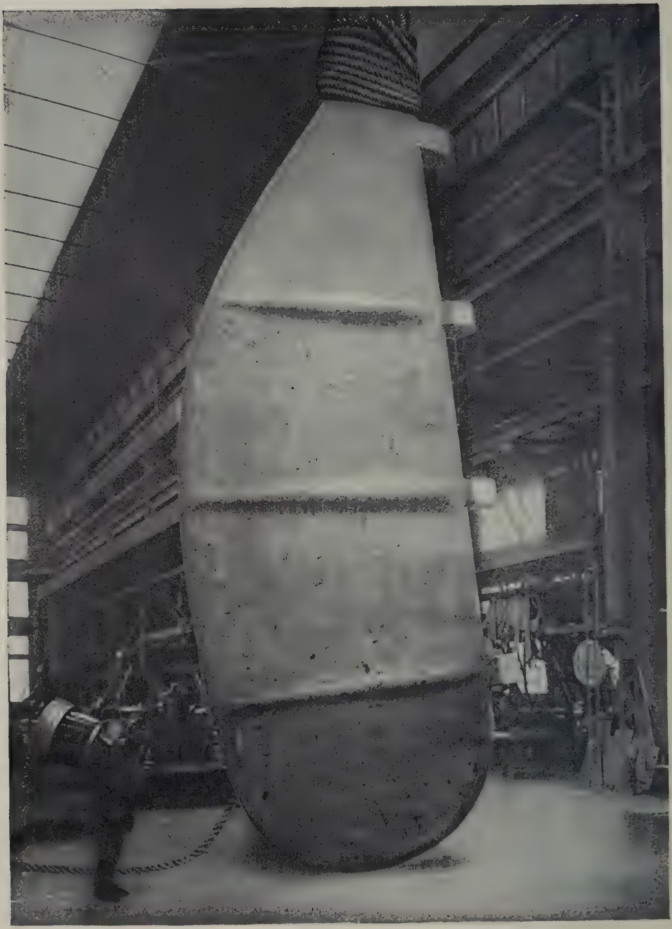
Low pressure turbine casing for S.S. "Old Colony."—Parsons' steam turbines, 3300 H.P. Built in 1907.



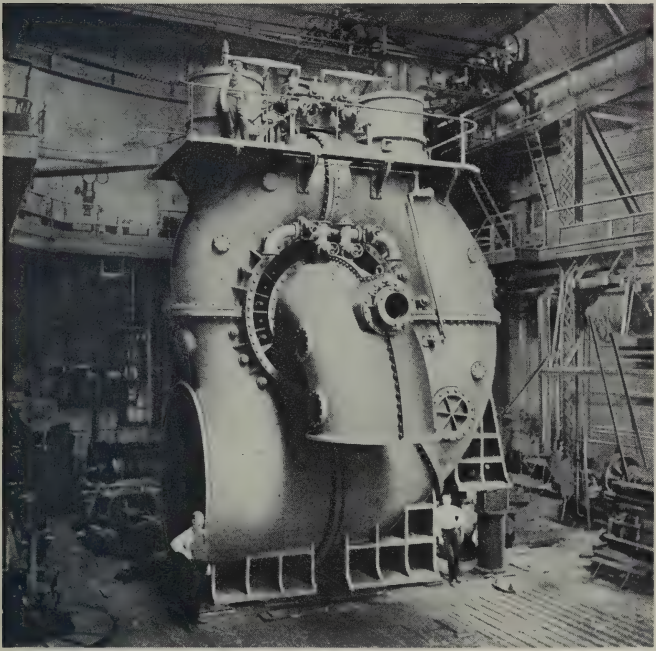
Low pressure rotor for S.S. "Old Colony," Parsons' steam turbines. 3300 H.P. Built in 1907.



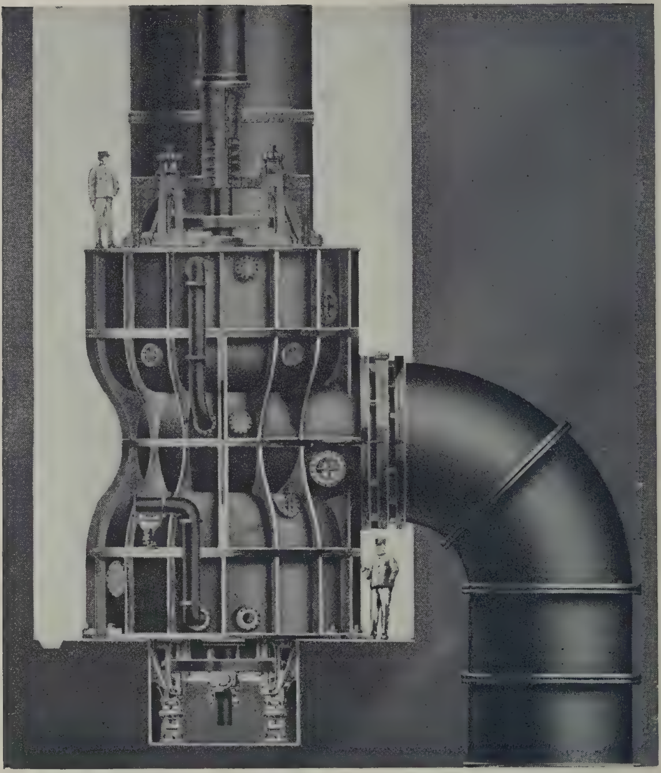
Double ended Scotch boiler for Southern Pacific S.S. "Momus."—The heaviest marine boiler ever built in America. Diameter, 15′ 4″ x 21′ 3½″ long. Constructed for 234 lb. working pressure. The shell plates are 1 11/16″ thick. United States Steamboat Inspection Service, Lloyd's rules, Weight 110 tons.



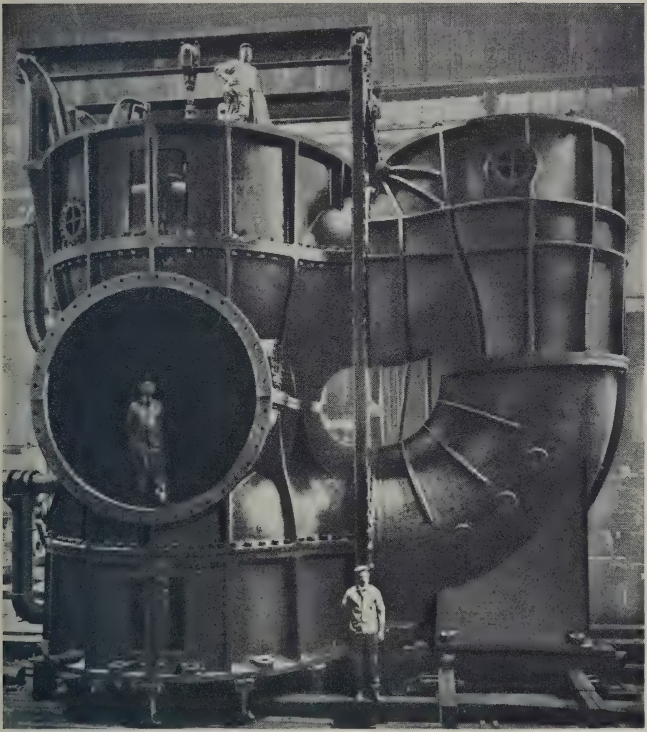
Solid cast steel rudder for the American Line steamer "St. Louis." —29′ high by 12′ wide. Shipping weight 66,640 lb.



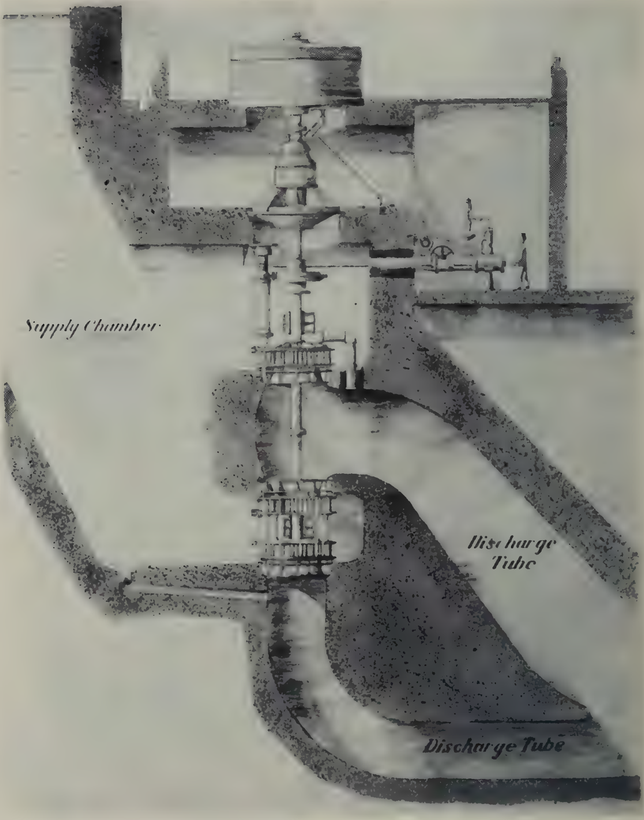
One of three 10,500 H.P. wheels for the Shawinigan Water and Power Company, Province of Quebec, Can.—Hydraulic head 135′; revolutions per minute 180. First unit completed in 1904.



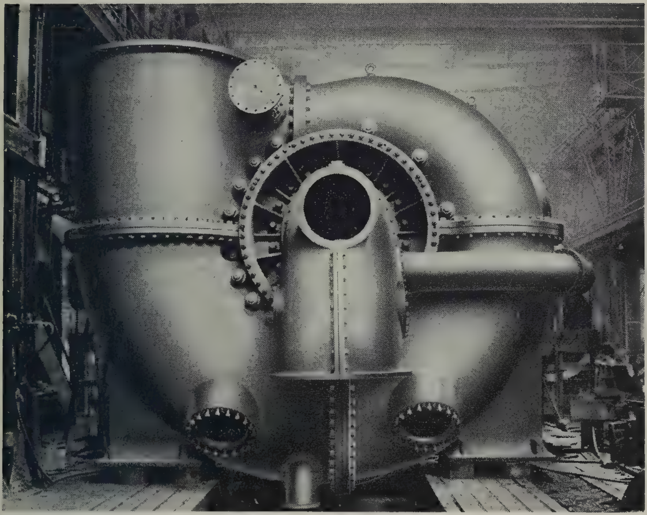
One of four 13,000 H.P. units, built for the Electrical Development Company, Niagara Falls, Ontario. (Now the Toronto Power Company.) —Hydraulic head 133′, revolutions per minute 250. When built these were the largest hydraulic turbines in the world. First unit completed in 1906.



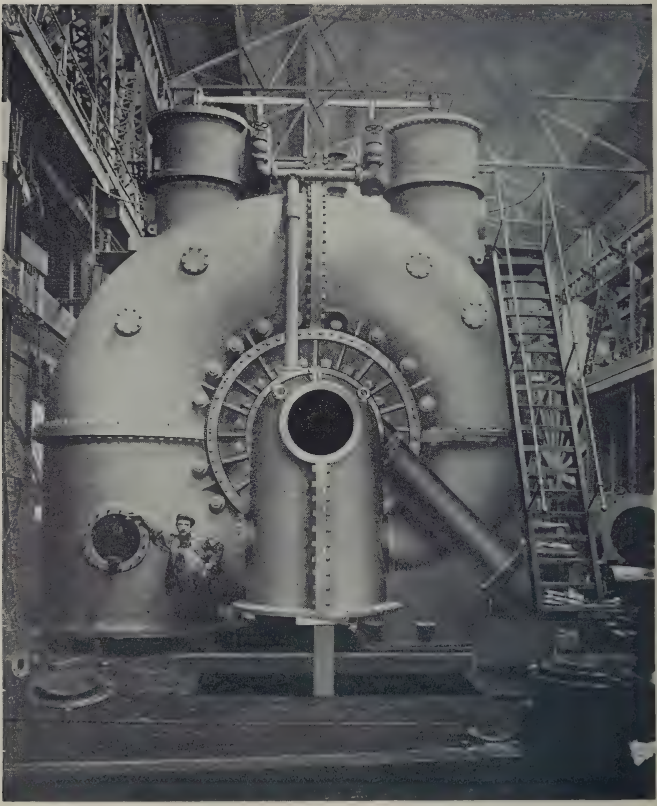
Casing and intake elbows for one of the 13,000 H.P. turbines for the Electrical Development Company, shown in illustration on page 88.



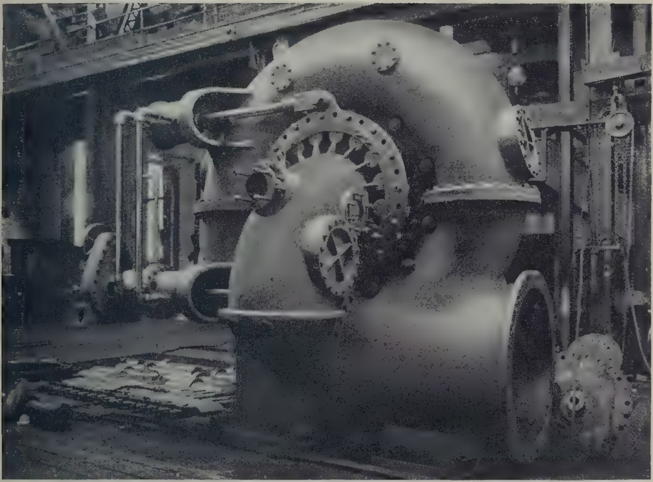
One of two 8000 H.P. turbines for the West Kootenay Power and Light Company, Bonnington Falls, British Columbia.—Head 70′; revolutions per minute 180. First unit completed in 1906.



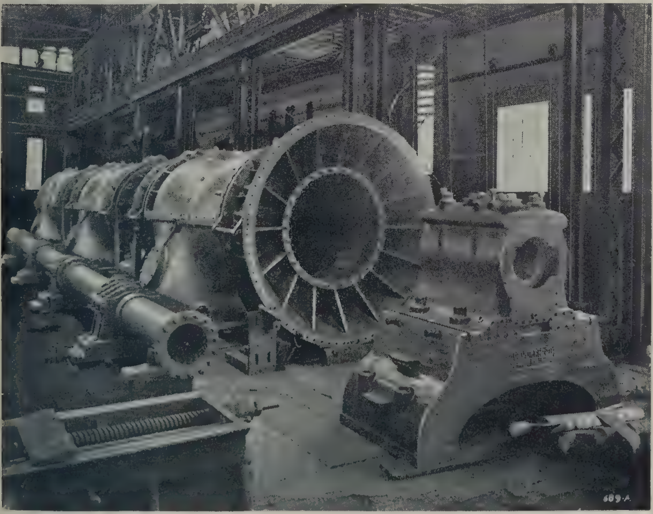
Casing for one of nine 10,000 H.P. hydraulic turbines, built for the Niagara Falls Hydraulic Power and Manufacturing Company, Niagara Falls, New York.—Hydraulic head 210′; revolutions per minute 300. First unit completed in 1907.



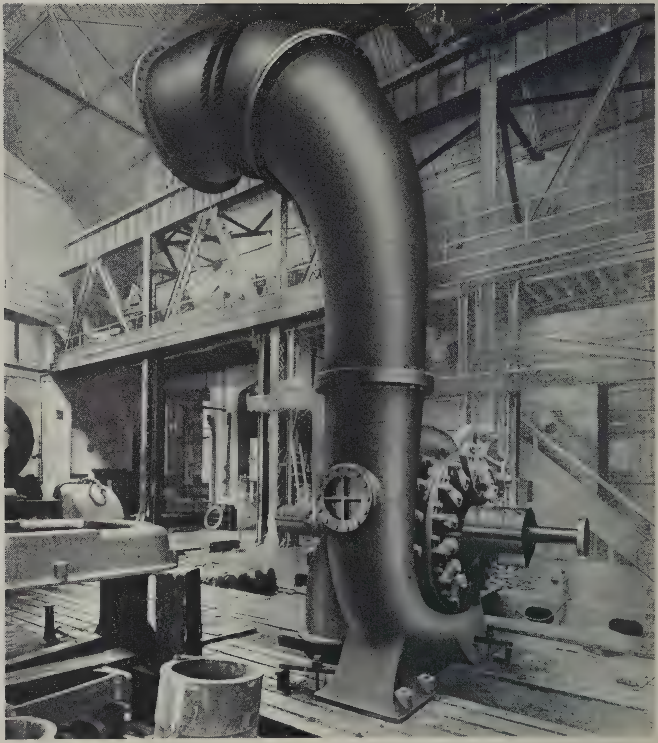
Casing for one of five hydraulic turbines of 6625 H.P., built for the Northern Aluminum Company, Shawinigan Falls, Province of Quebec, Canada.—Hydraulic head 133′; revolutions per minute 250. Station completed in 1906.



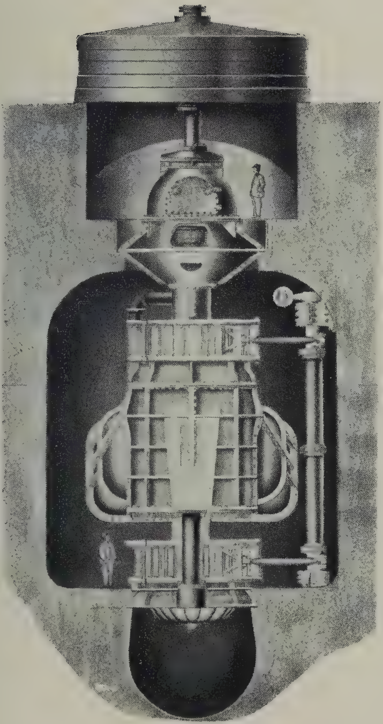
One of two 2750 H.P. hydraulic turbines for the Michoacan Power Company, State of Michoacan, Mexico.—Hydraulic head 160′; revolutions per minute 514. Station completed 1908.



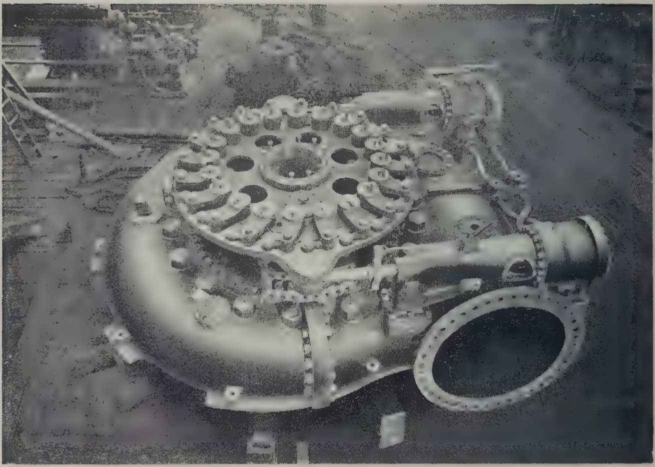
One of four 6000 H.P. turbines for the St. Lawrence River Power Company, Massena, N. Y.—Head 30′: revolutions per minute 140. First unit completed 1909.



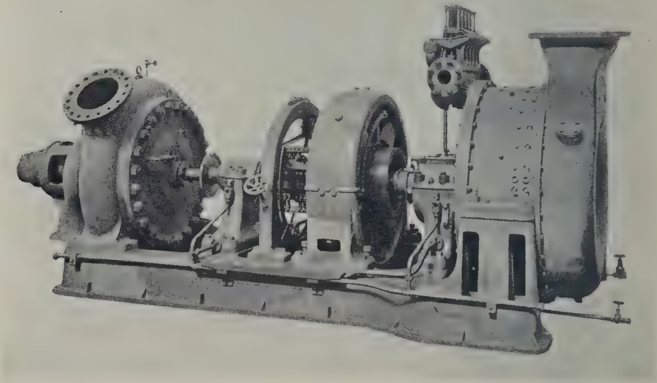
One 1000 H.P. exciter unit, built for the Niagara Falls Hydraulic Power and Manufacturing Company, Niagara Falls, New York, for use in their Station No. 3.



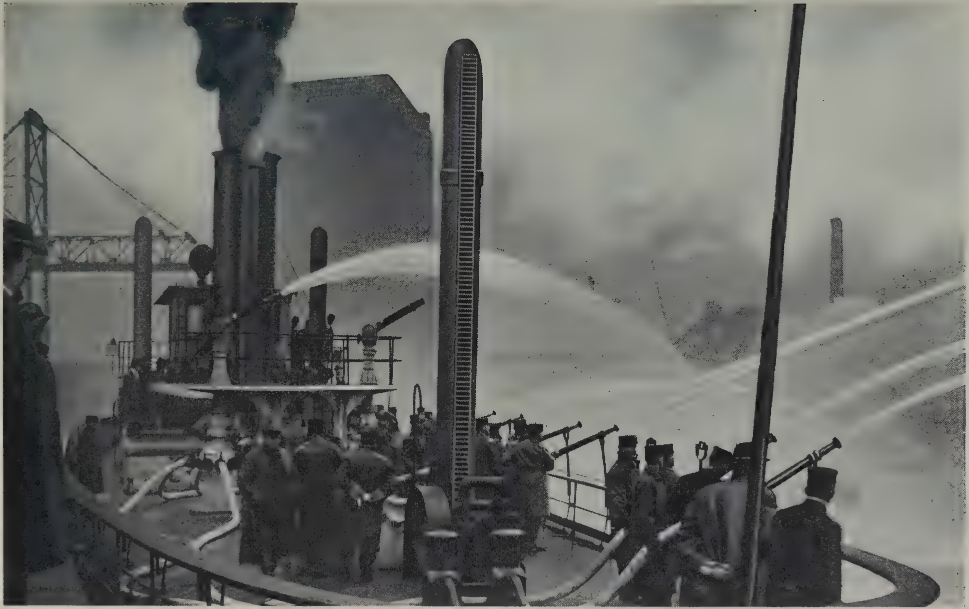
One of six 13,500 H.P. McCall Ferry Power Company's hydraulic turbines, to be located at McCall's Ferry, Pa.—Hydraulic head 53′; revolutions per minute 94.



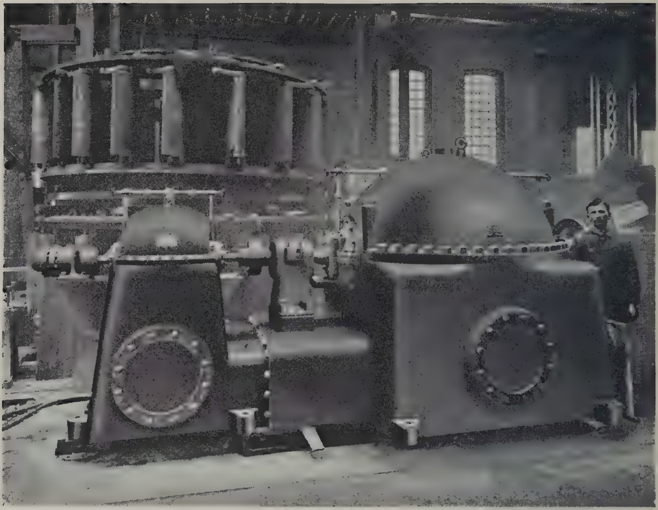
One of four 18,000 H.P. hydraulic turbines for the Great Western Power Company, Oroville, Cal., the highest powered turbines in the world. —Hydraulic head 525′; revolutions per minute 400. Plant completed, 1909.



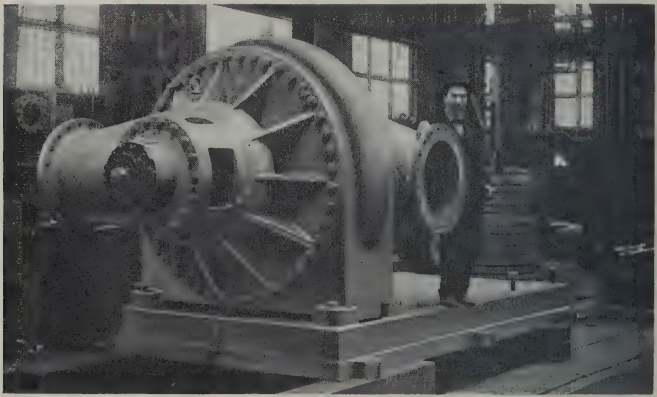
One of four multi-stage centrifugal pumps, built for the Chicago Fire Boats, "Joseph Medill" and "Graeme Stuart."



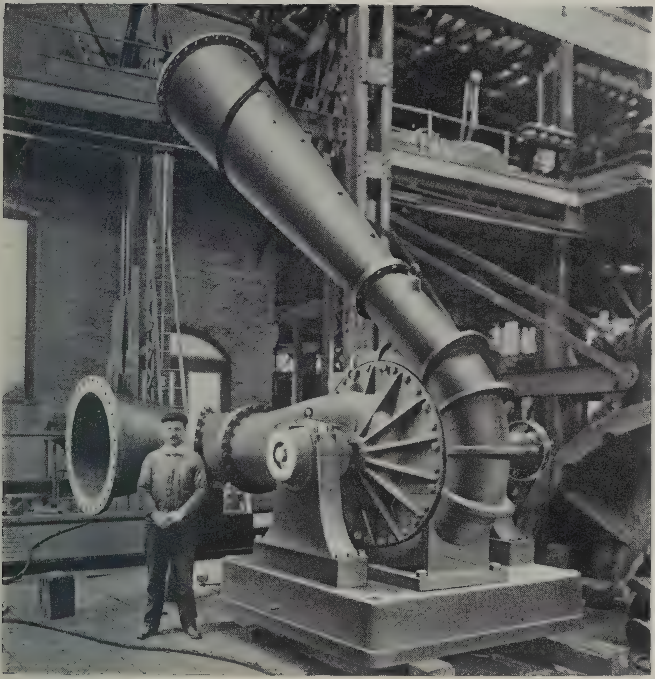
FIRE BOAT "JOSEPH MEDILL"



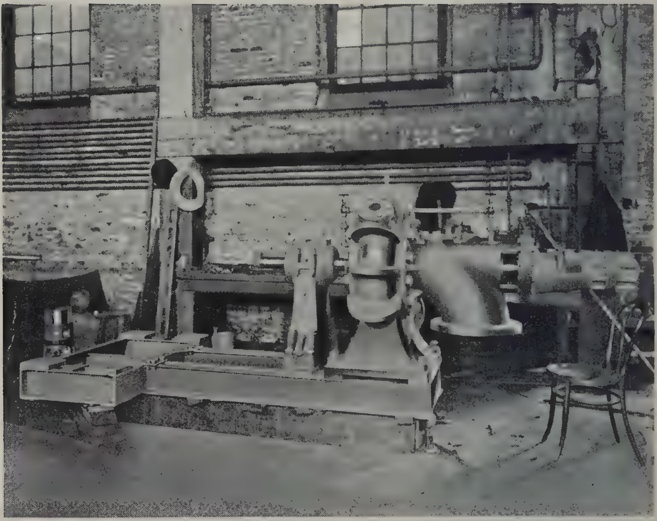
Steam turbine driven centrifugal pump, delivering 25,000,000 gallons per day, against 170′ total head.—Built for the Solvay Process Company, Syracuse, N. Y. Completed in 1908.



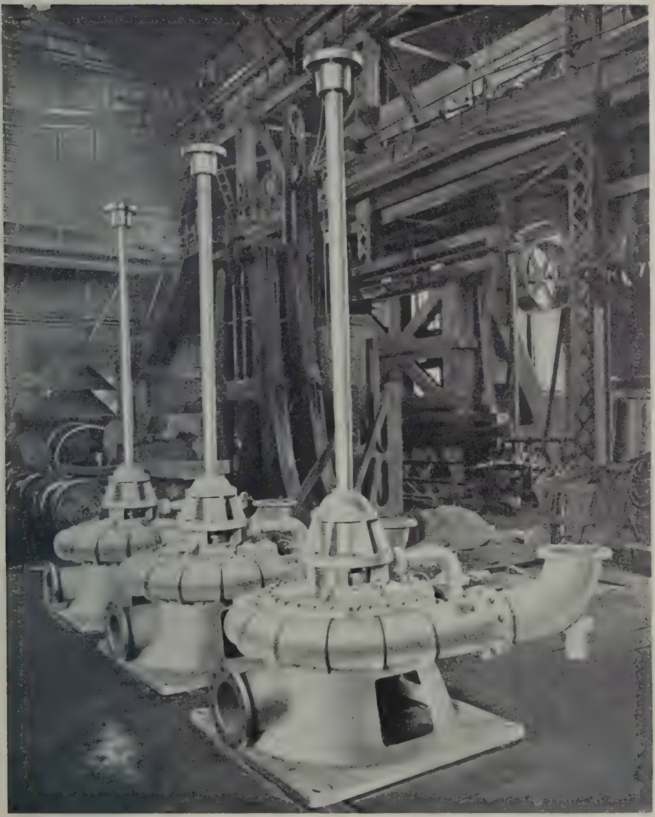
Multi-stage centrifugal pump, delivering 13,500,000 gallons per day, against 328′ head.—720 revolutions per minute. Built for the City of Duluth Water Works, Duluth, Minn.



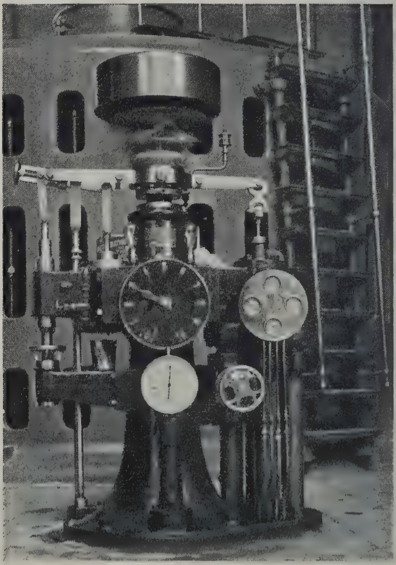
One of three single-stage centrifugal pumps, delivering 19,400,000 gallons per 24 hours, against 185′ total head.—Built for the Mexican Light and Power Company, Station No. 1, located at City of Mexico. Completed 1908.



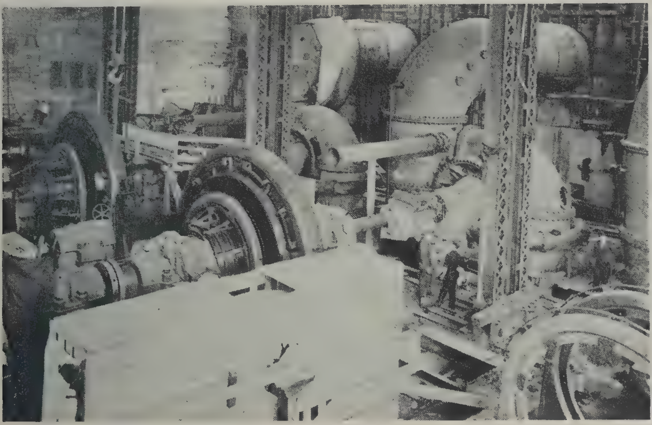
One of six single-stage motor-driven pumps, delivering 5,700,000 gallons per 24 hours, against 130′ head. Built for the Mexican Light and Power Company, Necaxa, Mexico. Completed in 1909.



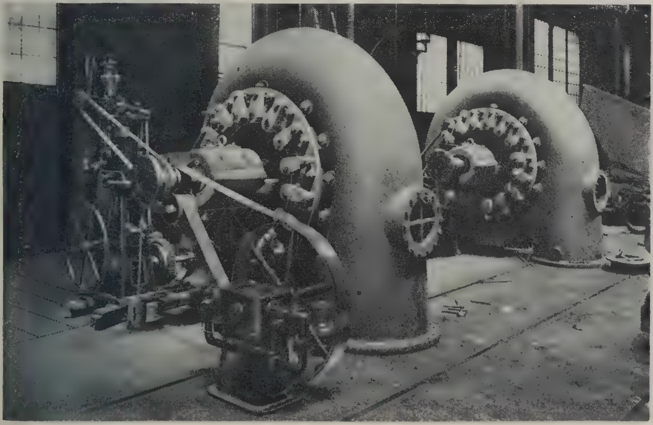
Three single-stage motor-driven pumps, delivering 3,600,000 gallons per 24 hours each, against 60′ head, located at McKees Rocks, Pa.—Built for the Pressed Steel Car Co. Completed in 1908.



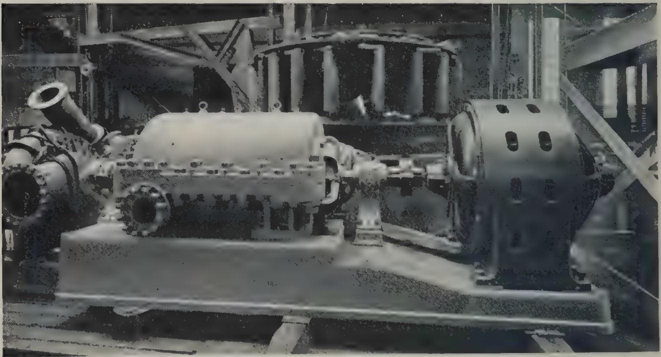
Double Floating Lever Governor, designed and built by the I. P. Morris Company for use with hydraulic turbines constructed by them.



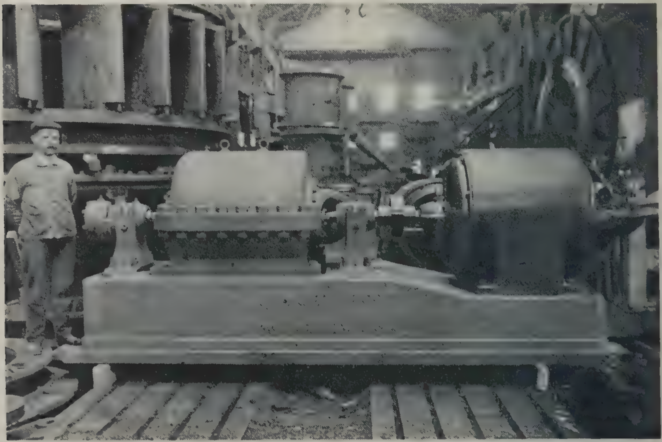
View of the Niagara Falls Hydraulic Power and Manutacturing Company's Station No. 3 during erection of the 10,000 H.P. turbines and generators. This station started in operation in 1908.



Two of four 750 H.P. wheels, built for J. G. White & Company, Inc.; and erected at San Juan, Porto Rico, in 1907.—Hydraulic head 175′; revolutions per minute 450.



Lake Superior Pump.—A multi-stage, motor-driven centrifugal pump; 3,000,000 gallons per twenty-four hours, against 820′ total head. Built for the Calumet & Hecla Mining Company, Calumet, Michigan.



One of five motor-driven, multi-stage pumps, delivering 1,440,000 gallons per day, against 755′ head.—Built for the Calumet & Hecla Mining Company, Calumet, Michigan. Completed in 1908.

CRAMP'S BRASS FOUNDRY

CRAMP'S SPECIAL BRASS AND BRONZE COMPOSITIONS

BABBITT METALS

Parsons' White Brass.
Cramp's Government Babbitt.
Cramp's Merchant Babbit.
Piston Ring Babbitt.

BEARING BRONZES

Cramp's Special Bearing Bronze.
Cramp's Phosphor Bronze.
Government Bearing Bronze.

BRASS AND BRONZE CASTINGS

Copper.
Type Metal.
Red Brass.
Yellow Brass.
Copper-and-tin Composition.
German Silver.
Gun Metal.
Copper-and-Zinc Composition.
Aluminum Bronze.
Parsons' Manganese Bronze.
Parsons' White Brass
Cramp's Magnesium Alloy.
Cramp's Aluminum Alloy.
Cramp's Special Hydraulic Metal.
Phosphor Bronze.
Ordnance Bronze.
Government Composition.
Nickel Composition.
Cramp's Water Turbine Bronze.
Cramp's Steam Turbine Bronze.
Cramp's Special Gear Bronze.

RODS AND SHEETS

Parsons' Manganese Bronze Rolled Rods.
Parsons' Manganese Bronze Rolled Plates or Sheets.
Parsons' Manganese Bronze Wire.

FORGINGS

Parsons' Manganese Bronze.

Also

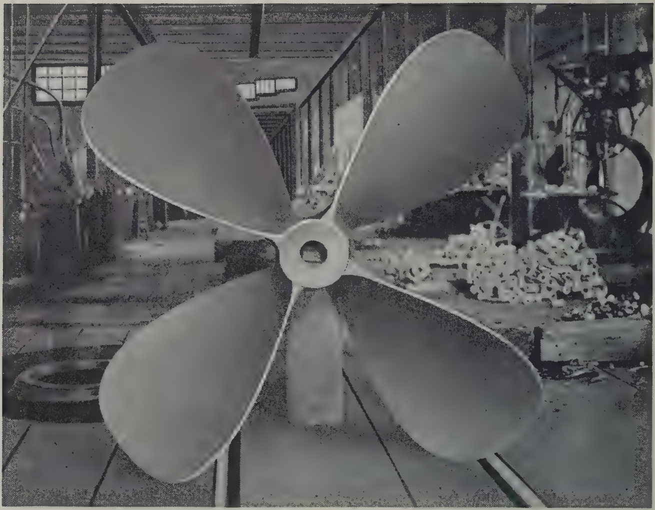
GALVANIZING

Cramp's Brass Foundry

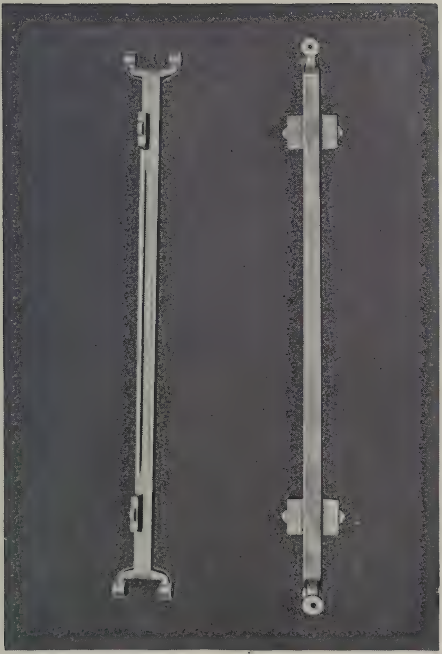
IN 1885 a Brass Foundry was established on the site of the present Cramp Foundry, at the corner of York & Thompson Streets, and was known as B. H. Cramp & Company. This was acquired in 1892 by the William Cramp & Sons Ship & Engine Building Company for the purpose of controlling the manufacture of special alloys and compositions necessary in developing the higher types of mechanism of the modern fighting ship and commercial vessel, as well as to meet the exacting requirements of the engineers of the I. P. Morris Company.

The Foundry has been greatly enlarged and extended. In addition to its own discoveries and developments, a contract was made in 1894 with the Manganese Bronze & Brass Co., Ltd., of Great Britain, for the exclusive use and control of their formulae and processes in America.

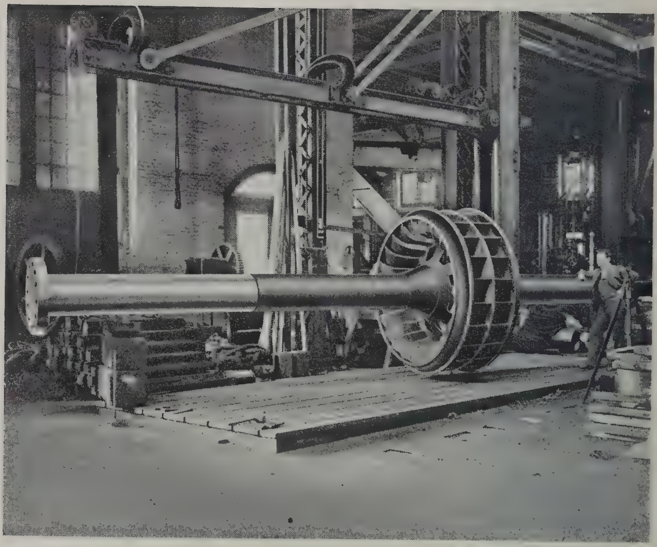
This department of the Company has extended its activities to cover nearly all of those fields where exactness of method and certainty of results is a desideratum. Some of its successes with all sorts of high-grade castings are illustrated in the following pages, which also give a general idea of the varied character of its special lines of work.



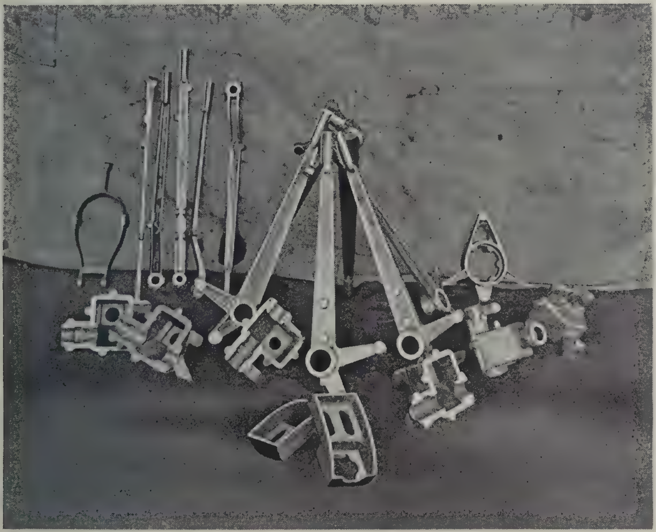
Parsons' Manganese Bronze propeller.



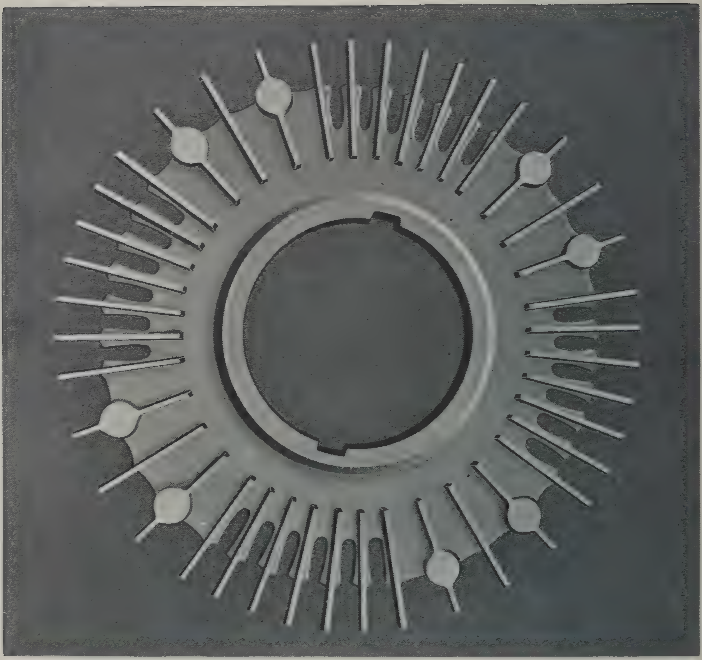
Axle castings of Parsons' Manganese Bronze



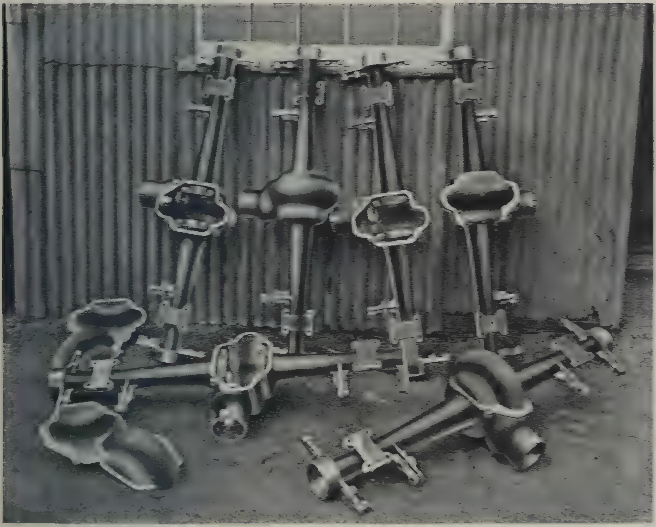
Bronze turbine runner and shaft for one of the 10,500 H.P. turbines for Shawinigan Water & Power Company.



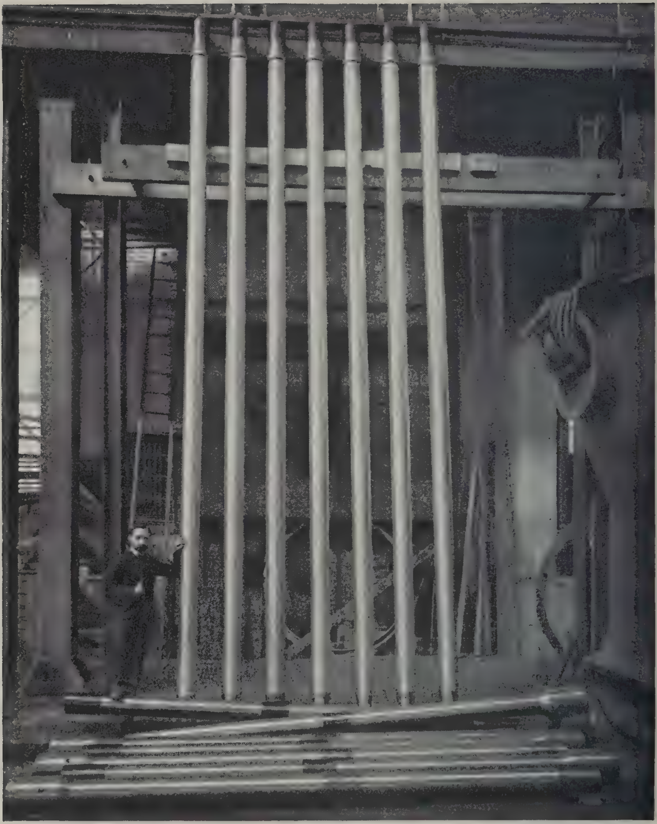
Miscellaneous automobile castings of Parsons' Manganese Bronze for the E. R. Thomas Motor Car Company, F. B. Stearns Company and The George N. Pierce Company.



Parsons' Manganese Bronze rotor vent plate casting for Bullock Electric Co.



Rear axle cases of Parsons' Manganese Bronze.



Parsons' Manganese Bronze forged piston rods for the Roosevelt Dam, Arizona.

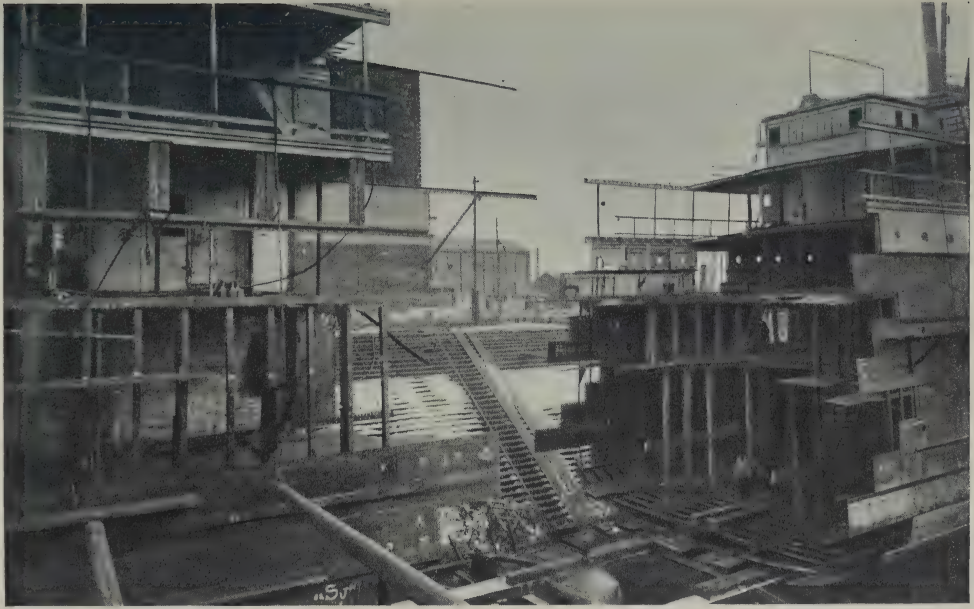
One day's shipment of Parsons' Manganese Bronze axle castings.

One day's shipment of Parsons' White Brass automobile bearings.

THE KENSINGTON SHIPYARD COMPANY

The Kensington Shipyard Company

WHEN the Cramp Company was incorporated in 1872 and moved the shipyard to its present location, its old yard, located at the foot of Palmer Street, was still operated as a dry dock and repair yard, and was so continued until May, 1900. At this time the property of The Charles Hillman & Sons Ship & Engine Building Company, which adjoined the repair yard, was purchased; and the two yards combined were incorporated as the Kensington Shipyard Company. This yard is equipped with a large dry dock and two marine railways and with first-class shops for expeditious and economical repair work of all descriptions.



Ship in dry dock, pulled apart for lengthening.

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